Paper
TRADE JOURNAL

Jan. 11, 1952

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ERWIN D. CANHAM
Editor, Christian Science Monitor

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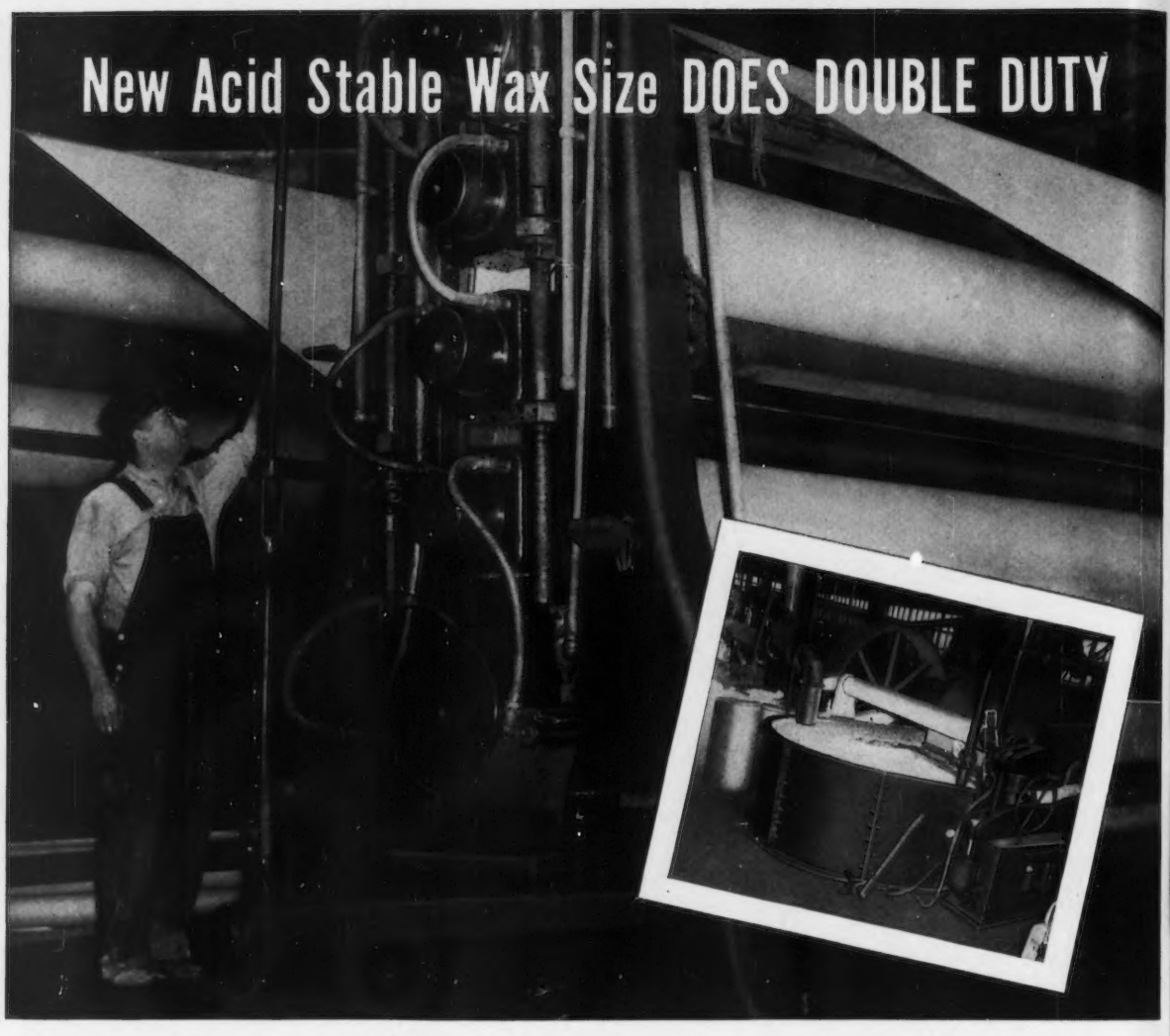

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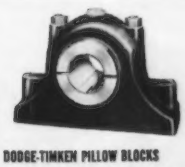

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Paper TRADE JOURNAL

ABP

VOL. 134 JANUARY 11, 1952 No. 2

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NEXT WEEK

Hot stock or Pre-Refining is always news. Read "Pre-Refining Sulphate Pulp" by Stewart Saunders.

Cylinder Vats will always start an argument but when Phil Goldsmith speaks, it is well to listen to his story on "Board Machine Vats."

Barking & Chipping 8-Foot Pulpwood is up to date. Be sure to read P. H. West's article in the January 18th issue.

REMEMBER THESE DATES

JAN. 14-17: Plant Maintenance Show and Conference, Convention Hall, Philadelphia, Pa.

JAN. 21: Chicago Section of the Technical Assn., of the Pulp and Paper Industry, Meeting, Chicago Bar Assn., Chicago, Ill.

JAN. 23-25: Annual meeting of the Canadian Pulp and Paper Ass'n, Mount Royal Hotel, Montreal, Que., Canada.

FEB. 19-22: American Pulp & Paper Assn., Annual Meeting, Waldorf-Astoria Hotel, New York, N. Y. Starts on Tuesday this year. 75th Annual Dinner Thursday, Feb. 21.

FEB. 19: Maine Alumni Luncheon, 12:30, Biltmore Hotel, New York, N. Y.

FEB. 20: M.I.T. Paper Industry Alumni luncheon, Engineers Club, New York, N. Y.

FEB. 20: Salesmen's Assn. of the Paper Industry, Annual Meeting and Luncheon, Waldorf-Astoria Hotel, New York, N. Y.

FEB. 18-21: Technical Assn. of Pulp and Paper Industry, Annual Meeting, Commodore Hotel, New York, N. Y.

MARCH 16-18: American Institute of Chemical Engineers, Atlanta Biltmore Hotel, Atlanta, Ga.

MARCH 24-26: The National Paper Trade Assn., Annual Meeting, Waldorf-Astoria, New York, N. Y.

MAY 5-8: Third Coating Conference of the Technical Assn., of the Pulp and Paper Industry, at the Sherman Hotel, Chicago, Ill.

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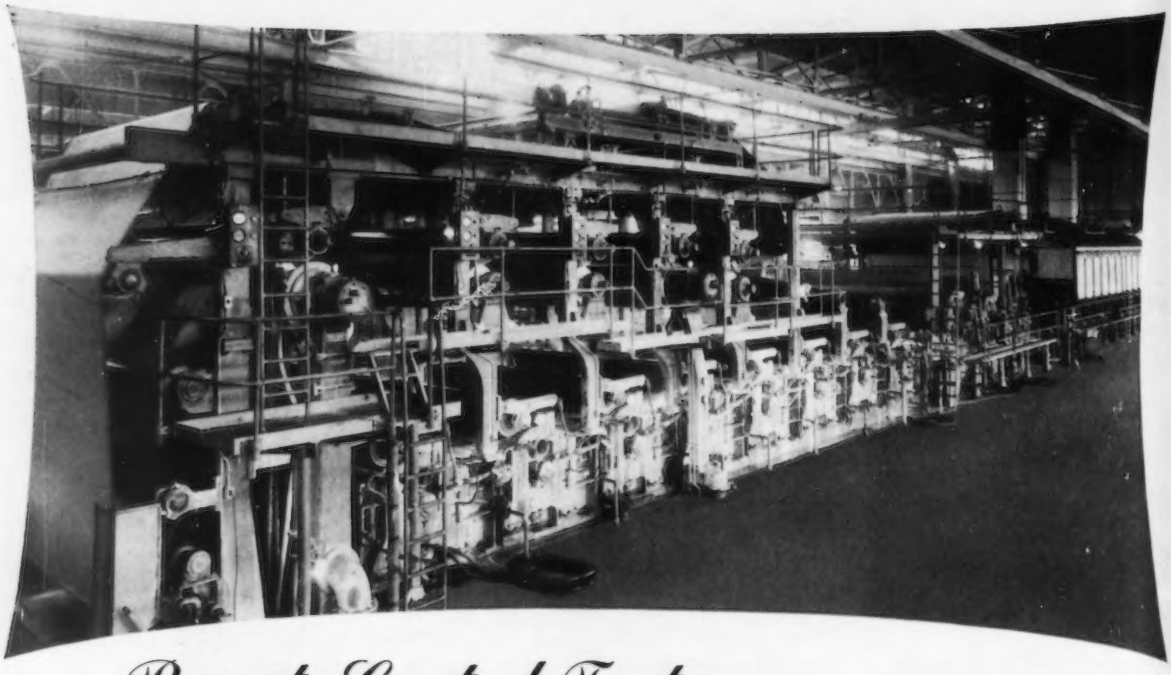

Remote Control Features on Black-Clawson Machines

A dominant characteristic of every post-war Black-Clawson machine is the incorporation of remote control features wherever possible, to wit:

1	White water pump valves remotely controlled.	8	Push button control of calender loading.
2	Headbox liquid level control automatic.	9	Primary and secondary arms on uniform speed reels remotely controlled.
3	Remote control of press roll loading.	10	Cutter pinch rolls air-operated.
4	Push button operation of felt stretchers.	11	Tension on unwind push button controlled.
5	Clutches air operated.	12	Automatic transfers on rope carriers.
6	Push button operation of belt shifters.	13	Air-operated brakes on dryer sections.
7	Push button operation of calender lifts.	14	Air-operated wire guide features automatic alarm and/or/stop.

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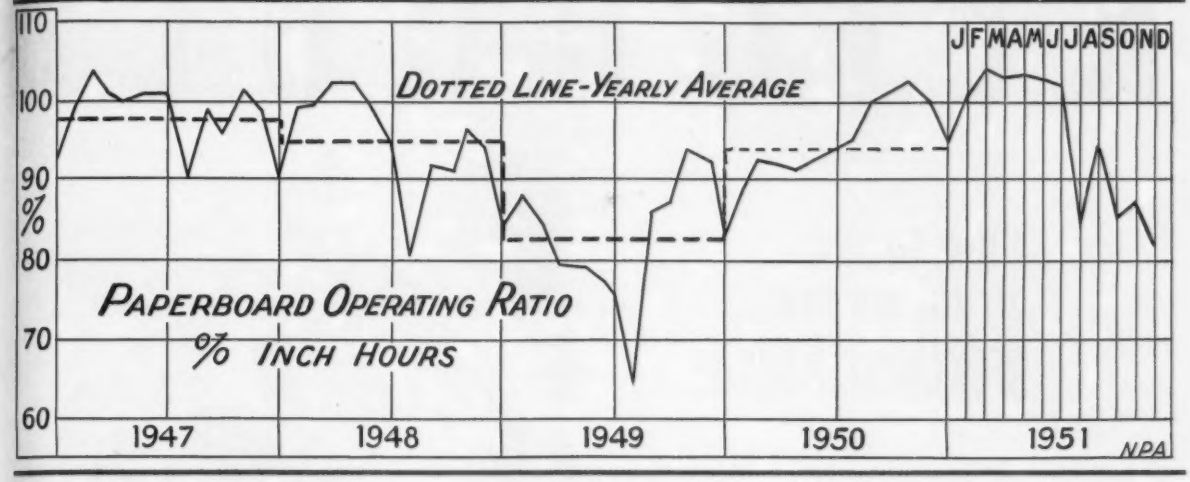
OUR BUSINESS



Brief of Important Figures

Source	Production	WEEK ENDING Dec. 29, '51	Dec. 1, '51	Dec. 30, '50
APPA	Paper Production Percent Capacity[3]	60.4	99.9	69.2
	Unbl. Kraft Paper Production Percent	66.7	107.2	59.9
NPA	Paperboard Operating Ratio Percent Inch Hours	40	80	63
		Nov. 1951	**Oct. 1951x**	**Nov. 1950**
APPA	Paper Production* (Except Newsprint and Building Papers) ....Tons	930,000	946,039	872,000
	New Orders ....Tons	864,000	941,862	831,000
	Unfilled Orders ....Tons	920,200	976,113	869,900
	Shipments ....Tons	920,000	946,295	872,000
		Dec. 1951	**Nov. 1951**	**Dec. 1950**
NPA	Paperboard Production ....Tons	757,914	794,359	862,905
	New Orders ....Tons	768,320	685,733	778,394
	Unfilled Orders ....Tons	358,720	365,363	617,245
	Our Customers Activities Index[1]	**Latest Mo.°**	**Previous Mo.°**	**Year Ago°**
FRS	Manufactures Total Index	231	233	229
	Durable Mfg. Index	276	274	263
	Nondurable Mfg. Index	194	199	201
	Chemical Products Index	307	306	282
	Mfg. Food Products Index	178	190	173
	Printing and Publishing Index	181	180	183
ODC	Magazine Advg.-Printer's Ink Index	403	379	342
	Retail Sales Combined Adjusted Index	379.4	372.9	349.1
	Drug Index	253.0	251.4	237.3
	General Merchandise Group Index	394.4	392.2	364.6
	Grocery and Combination Index	446.0	449.6	395.1
	Prices Index			
BLS	Consumers Price Index[1]	187.4	186.6	175.6
	Wholesale all Commodities[2]	178.2	177.6	169.1
	Wholesale Foods[2]	189.5	188.0	172.5
	Commodities other than Farm Products and Foods[2]	166.7	166.9	161.5
	Wholesale Pulp and Paper[2]	200.5	199.7	173.4
	Purchasing Power of Dollar, Consumers Prices[1]	53.4	53.6	56.9
	General Activity Index			
FRS	Mfg. Production-Worker Payroll	429.4	436.9	415.8
	Unemployment Compensation Initial Claims (M)	902	725	720
	Miscellaneous Carloadings–Thousands of Cars	1,664	1,967	1,673
	Electric Output (Million KW hr.)	37,775	35,296	34,338
PTJ	Average 32 P & P Common Stocks as of Jan. 5	$37.60	$37.30	$35.08

[1] 1935-39 = 100 Unadjusted Index.
[2] 1926 = 100.
[3] New 6-7 day basis.
* For details see APPA Monthly Statistical Summary—November 1951 Estimated Figures.
° Latest Month Available on Request.
x Revised figures.

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Paper TRADE JOURNAL

TRENDS

Office of the PAPER TRADE JOURNAL,
Wednesday, January 9, 1952.

Week-end reports took note of a sharp rise in industrial equipment orders during the first days of the year. Compared with the buying slump of December, a 20 to 35 percent average gain is reported.

Interpreted as an indicator of market trends because the orders include machine tools material handling devices, process equipment and construction machinery, all of which are essential to national defense and essential civilian requirements, the columnist reported that the usual January letdown is unlikely and that the volume of new orders could be expected to continue at high level through June. Thereafter and into 1954, manufacturers would be engaged in reducing backlogs, it was believed.

Trends Confused By Defense Program

Accepting the facts as an honest report, we doubt the conclusions as a barometer of market trends during the year.

So much of normal business is thrown out of balance by controls of material, etc., particularly the very ones involved in equipment orders, that buying in the first few days of January does not tell the story.

It is probable that some improvement in paper buying also started last week, which also could be interpreted as an upturn. What is more likely is that this spurt will replace floor stocks which were allowed to run down during November and December so as not to be taxable. When these are rebuilt, there is seen ahead a lull comparable perhaps to the early months of 1950 when the paper output stood at 92.6 for January, 95.6 for February, 96.7 for March.

Most people see a good year ahead for business as a whole, though some are dubious about the early months, hopeful about the latter part.

If, as one economist believes, retail buying is a better yardstick of business trends than all the statistics one can assemble, then buyer resistance to January sales must be reported, with consumers shopping for quality and right price. Which boils down to the fact that a buyer's market is established at the retail level, and is slowly but surely returning on all types of papers and boards. Demand for white papers is still strong, however.

Effect on Wood Pulp Market

This demand for white papers is stressed because of its effect on demand for bleached pulps. Nowhere is any easing seen in requirements for domestic or overseas bleached krafts or bleached sulfites. Unbleached sulfites also, for the most part, are in a strong position, though some *news* grades of Canadian have been easy for some time.

Unbleached krafts, on the other hand, are notably softer, though offers at less than ceilings have been limited to isolated cases of wet southern pulps.

Amendments in M-72, Wood Pulp Order

Amendments to M-72 released on December 28 authorize an increase in inventories of unbleached kraft pulps from 45- to 60-day supply. Where such an order had not already been anticipated, the amendment is aimed at correcting market unbalance, NPA indicated.

British Restrict Pulp Consumption

Reporting further on the effect of the British financial position on the woodpulp market (see January 4 *Trends),* it is learned that paper mills in the United Kingdom are now subject to a usage limitation which is expected to cut back demand by some 75,000 tons. The restriction was imposed on January 6, it is reported.

To press time, it was not clear how Scandinavian pulps would react to the limitations set for British purchases of pulps and papers and on consumption. *The World's Paper Trade Review* reported on December 27 that "some first-quarter prices have been announced showing no price change." What pulps these covered was not indicated.

Swedish writers believe that no 1952 prices will be fixed for some time because of the uncertainty surrounding these matters.

No Alteration in Swedish Position Seen

Agents for Swedish mills in this area see no alteration in the position of their principals, so far as this market is concerned.

Pointing to the greatly increased costs of labor and woods in Sweden, and to the strong demand for their pulps in world markets at prices well over U. S. ceilings, they hold that should the British mills be unable to take the contracted amounts, Swedish producers are likely to put their output into inventory rather than break the price at time when demand could soar quickly. (The British restrictions on sterling spending are set for the first six months of 1952.)

Asked if an increase in pulp to the U. S. could be expected, most agents spoke of a lack of interest in this market at today's prices, though a major importer expects an increase of 15 percent in contract tonnages, over and above the 50 percent sent here during late 1951.

The consensus here is that prices will hold firm at today's levels, however, and that the Swedes will stockpile against a turn in the market.

Supply-Demand Balance in Towels

Strictly speaking, there are two entirely different markets for towels and toilet tissues: industrial and household. Each has its own grades, styles of packings, each its own marketing conditions. For both, however, the industry holds that a supply-demand balance was struck sometime last Fall.

Industrial Towel Future Bright

Whether one speaks of the "C" fold or the brown industrial towels, the inventory position has been strong in the hands of plants and distributors for some time. Stocks which were allowed to run down in late November and December prior to stocktaking, now are being rebuilt, and a steady gain in demand from Defense plants is anticipated throughout the year.

The exception is, however, in those areas where unemployment is causing anxiety to wage-earners as well as to businessmen.

Government buying to U. S. specifications is heavy for all branches of the service, with a pickup in volume likely for new draftees.

As a whole, the industry sees good business ahead as the defense program gathers momentum. Paper towels are a necessity to good labor relations. In some plants, bath-size towels are served up with shower baths.

Price generally is firm at CPR 22 levels, the price varying by quality and by inches of towels. Size varies by mill from 10¼" x 13", 10¼" x 13¼", 10-7/16" x 14". Instances of special discounts for large orders are reported.

Overpricing of Household Towels?

No unanimous opinion supports the housewife's complaint that the household towel in rolls has been priced out of her reach. There are some who concur that paper towels are largely confined to cooking and other kitchen usage, rather than to handwiping, because the cost has become too high for the average household.

Unlike the industrial towel or toilet tissue, this field once entered is not necessarily assured. The cloth towel is always competitive on the basis of costs which have risen steadily over a period of years.

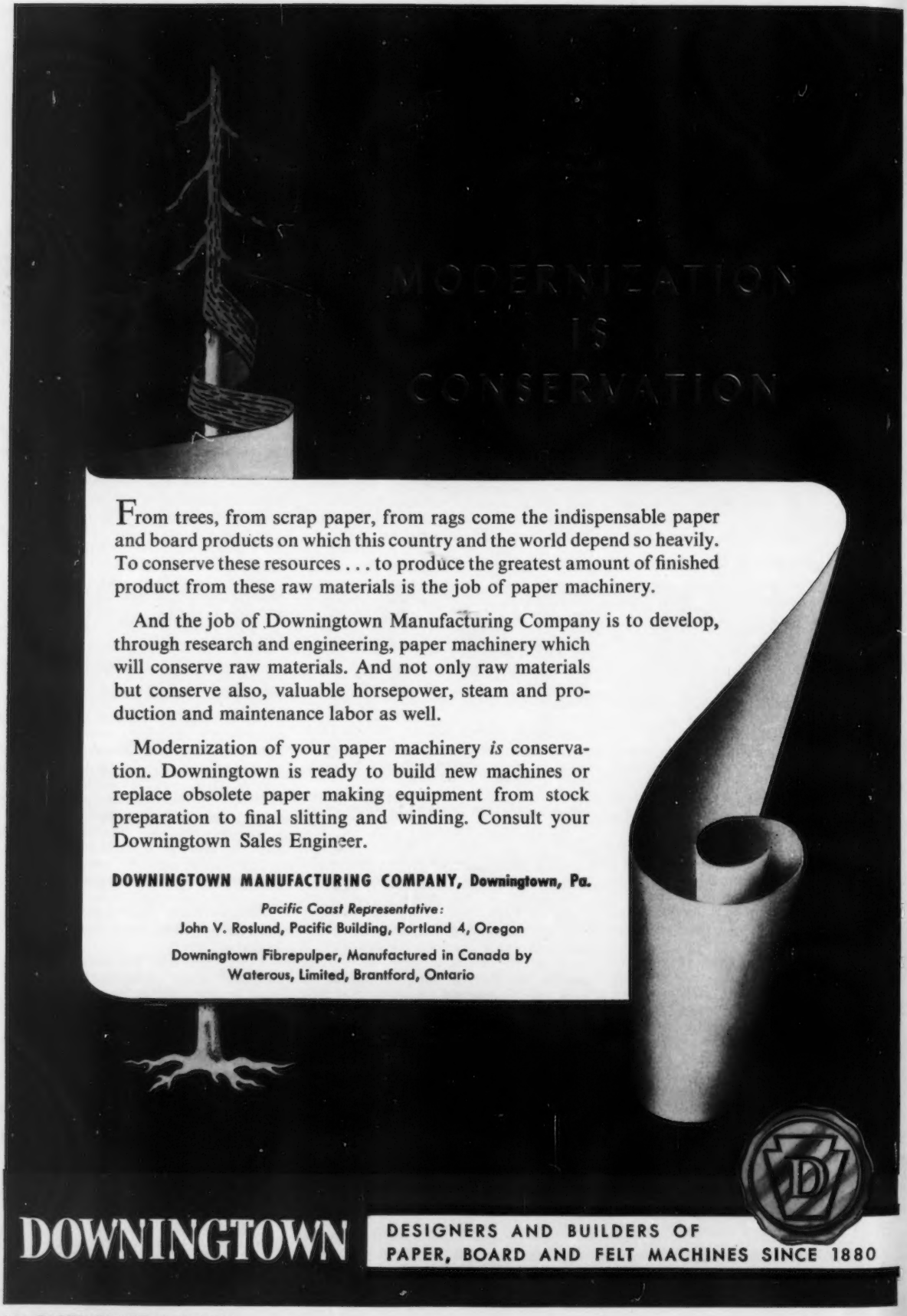
Price resistance has become a factor in demand, also competition from private brands sold by department stores which are in heavy stock position and are being offered quantity deals.

Inventory position in the midwest merchant group on industrial towels ranges from 50 to 90 days, with one at 120, many around 30.—E.P.N.

Paperboard Production (Tons)*

	Dec. 29 1951	Dec. 22 1951	Dec. 30 1950	Month of Dec.
Production	151,952	203,923	139,385	757,914
New Orders	179,761	153,591	158,208	768,320
Unfilled Orders	358,720	333,224	617,245	358,720
% of Activity	40	86	63	

* Source: National Paperboard Assn.



From trees, from scrap paper, from rags come the indispensable paper and board products on which this country and the world depend so heavily. To conserve these resources . . . to produce the greatest amount of finished product from these raw materials is the job of paper machinery.

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New Milk Bottle Plant

Figure 1—View of the International Paper Co.'s New Atlanta Plant.

The new million dollar milk bottle plant opened recently in Atlanta is an important unit of International Paper Company's Single Service Division. Their new Atlanta plant is reported to be the most modern of its type in the world.

The operation is devoted exclusively to the production of Pure-Pak milk containers. The plant is geared to a production rate of 30 million containers a month. The production includes all sizes of containers including quarts, pints, half-pints, third-quarts, 12-ounce, 10-ounce and tear-top containers for cottage cheese and sour cream.

D. D. Milsom, plant manager, said the location of the new plant at 2323 North Sylvan Rd., Atlanta, reflected the growth of the dairy industry in the Southeast. The plant, from its central location serves customers in Georgia, Florida, North Carolina, South Carolina, Alabama, and Tennessee.

Since 1945, the sale of paper milk containers by dairies has tripled. In 1940 approximately 4.8 percent of all milk containers used were paper; by 1945 the percentage had increased to 10.7 percent; by 1950 it had leaped to 31.2 percent.

The Single Service Division in Atlanta holds a license from Ex-Cell-O Corp., Detroit, Mich., makers of Pure-Pak milk packaging equipment.

Process and Equipment

The Ex-Cell-O Process

A roll of .016 caliper fully bleached sulphate milk container stock is mounted on a rollstand and then is unwound —traveling through four aniline printing units which with the use of water type aniline ink and rubber printing plates is capable of printing two colors on each side of the web. The printed web then travels through an electric drying oven, where the ink is dried by pre-heated forced air at a temperature of about 450°F. The dried web then travels through the double set of rotary dies.

The first set does the scoring or creasing and the second does the cutting. The web speed is a maximum 500 feet per minute; capable of producing 1,000 blanks per minute. The blanks are then delivered as shown in *Figure 3*. The trim is automatically removed by a suction system which carries it directly to the waste paper baling press.

The printed cut and creased blanks are then stacked on skids holding approximately 20,000 blanks which are then transferred to the gluing department.

The next steps are to prepare and glue the patch behind the pouring opening and to glue the side seam and fold the carton into the completed form for packing in the shipping cases.

The patch stock is cut from a 2⅛" roll of the identical stock used in the rest of the container, and an inner cut-out is made which forms the pouring lip which is then sealed inside to insure complete sanitation.

Another section of the gluing machine places a score across the patch perfectly synchronized with the underlying score in the blank insuring a clear break at the gable when the container is later formed at the dairy.

To glue the side seam it is carried over a knurled glue wheel which is revolving in the glue pot. Then the blank is folded by the means of synchronized belts and transferred to the pressure section or stacker which holds the blank under compression for about three minutes to allow the glue to set. The blanks are then inspected and packed by hand in the shipping cases. The gluers are made by the International Paper-Box Machine Co., and operated at 300 container blanks per minute.

Pack-O-Matic machines made by J. L. Fergerson are used for gluing simultaneously bottom and top flaps of the corrugated packing cases in intermixed sizes automatically.

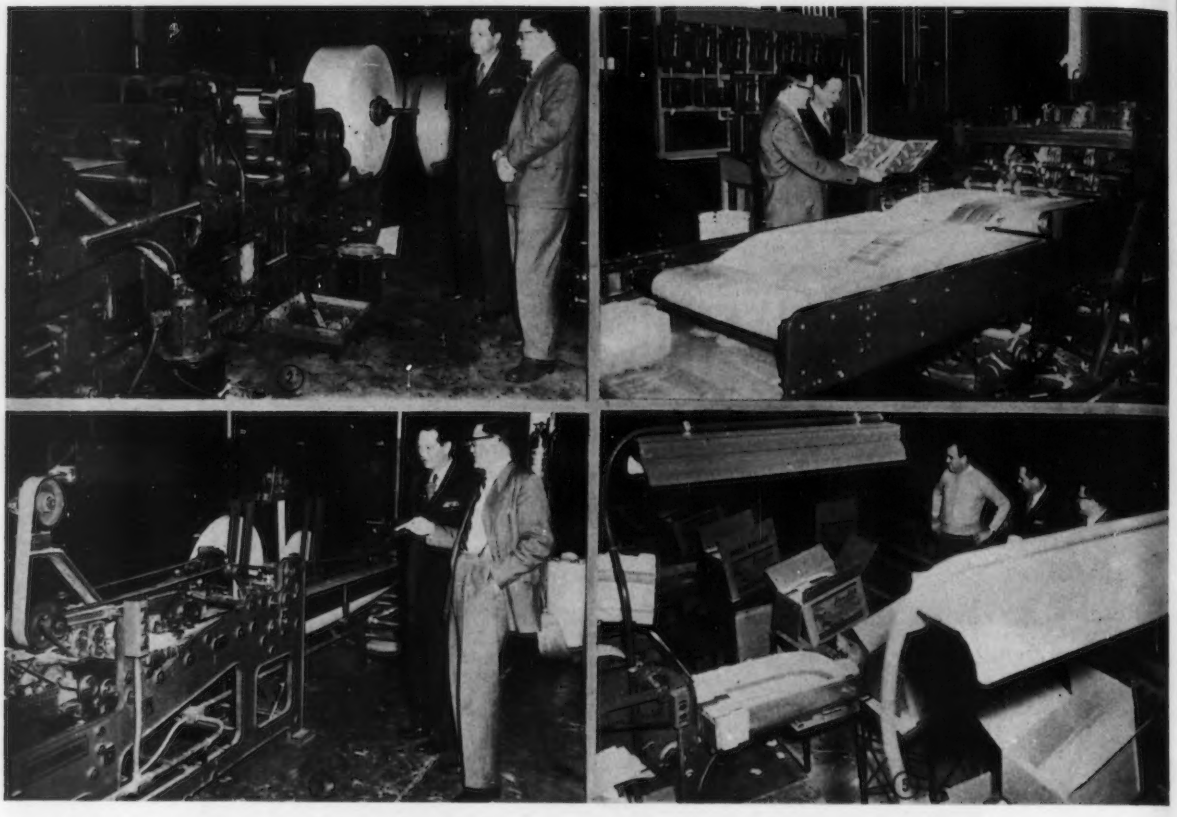


Figure 2—A view of the Champlain Ex-Cell-O Press, showing a roll of paper mounted on the roll stand and side view of one of the Champlain Printing Units. Figure 3—Mr. D. D. Milson and Adrian Norton (left) are standing by the Delivery Section of the Ex-Cell-Converter Press. The picture shows the blanks coming through the rotary cutting and creasing dies and being stacked on the delivery table. Figure 4—Mr. D. D. Milsom, Plant Manager, pointing out to Adrian Norton (railroad man) the Gluing Machine in operation. Figure 5—View of the packing stands showing the packing cases in position for the female packers and inspectors who place the blanks in reversed handfuls of fifty in the cases.

Packing cases are in position for the female packers and inspectors who place the blanks in reversed handfuls of fifty in the cases. The cases hold 500 quart containers or 1100 pint or one-half pint containers.

The plant now employs 75 workers but anticipates a continuous increase in business. By the end of the year the company feels this number may be doubled.

The Single Service Division became a wholly owned subsidiary of International Paper in 1946, and a division in 1947. Behind the new operation stands the huge Southern Kraft Division of the company.

The officials of the Single Service Division plant in Atlanta are: D. D. Milson, plant manager; G. G. McArnerney, superintendent; O. W. Hamilton, planning department manager; W. T. Turner, office manager.

Warren Donates $50,000

S. D. Warren Co., Cumberland Mills, Maine, presented a gift of fifty thousand dollars to the Maine Medical Center Building in December. The contribution was made in honor of the men and women of Cumberland Mills and Gardiner, according to Everett P. Ingalls, manager.

Saguenay to Operate Quebec Pulp & Paper

OTTAWA—Paper mills at Chicoutimi, Que., which have been unused for almost 20 years and were formerly operated by the Quebec Pulp and Paper Corp., which went into bankruptcy, will be reopened by a company known as Saguenay Pulp and Paper Corp.

A short time ago, Premier Maurice Duplessis of Quebec had disclosed that the Provincial Government, which had taken over the bankrupt company in 1949 for $1,500,000, had received an offer for the paper mills and assets.

NEW PRODUCT

"French Wrap" Corrugation

To provide a complete corrugated board line to their accounts, Shelton Manufacturing Co., Inc., 591 Ferry street, Newark, N. J., is now producing the "French Wrap" type of corrugated wrapper. Cognizant of the critical shortage of kraft papers, Shelton has adopted a low-priced line of wrapper to assure utmost economy for the consumer. Facilities have been enlarged to provide "French Wrap" in any size required.

Brown To Start Basic Training Course

Brown Co., Berlin, N. H., will start a 3-month basic training course in January, 1952. It will include free lessons in Industrial Economics, Arithmetic, Mechanics, Blueprint Reading, Bench Work and Industrial Safety. Classes will be under the supervision of the company's plant engineers. Subjects were selected by them and Willard Baker, superintendent of maintenance, from a list prepared by International Correspondence Schools.

Brown Co. recently sponsored a Field Day for fifty farmers and other woodland owners from Southern New Hampshire. A part of the program was a tour of stands recently operated by the Forestry Division of the New Hampshire Forestry and Recreation Commission, with Brown Co. forester pulpwood purchasing agents guiding small groups.

Crocker, Burbank Distributor

Milton Paper Co., Inc., New York paper merchant, has been appointed a distributor for the lines of Crocker, Burbank Papers, Inc., of Fitchburg, Mass.

MAKING A CHECK. Sinclair Rubilene shows complete separation from water.

Fine, smartly-designed fibre rugs made by the Deltox Rug Company are favorites with budget-wise consumers from coast to coast. The Deltox plant, in Oshkosh, Wis., generates its power with an Ames 4-cyl. Uniflow Steam Engine, shown here.

At first, this engine was giving Deltox engineers trouble with sludging and oil emulsification in the circulating system. Then, about a year ago, Deltox changed to Sinclair RUBILENE® Oil Medium. The gauge glass was watched vigilantly, but there was no evidence of emulsification or developing sludge.

Besides ending emulsification and sludging, the subsequent yearly overhaul showed practically no valve cam or bearing wear; and carbon deposits in the valve gearing were negligible. Furthermore, a check of past records showed a cut of 19% in make-up oil.

Are you getting full satisfaction from the circulating systems in your plant? Perhaps a Sinclair Engineer can save you maintenance and operating expense. Get in touch with your nearest Sinclair Representative, or write to Sinclair Refining Company, 600 Fifth Avenue, New York 20, N. Y.

SINCLAIR OILS for circulating systems

B. C. Research Council Discovers Method To Reduce Kraft Mill Odors

The release of foul odors has been a major defect of the kraft pulping process ever since its development more than 60 years ago. The problem of containing and controlling these odors is difficult because they are liberated at several points which are usually widely separated in the mill. The principal malodorous substances, hydrogen sulphide, mercaptans and organic sulphides and disulphides, are all readily volatilized and, while some of them are soluble in alkali, their acid properties are so weak as to render them readily displaceable by carbonic acid or even by heat alone.

The furnace gases generally contain a relatively small concentration of malodorous material but the total volume is so great that a considerable nuisance may result. The noncondensable gases from the multiple-effect evaporator of the recovery system are a second source of odor and one that often tends to be particularly rich in hydrogen sulphide.

The gases liberated in relieving and blowing the digesters are a major source of organic sulphur compounds possessing very foul odors indeed. Control of these gases is particularly difficult because their rate of release is subject to the large fluctuations inseparable from a batch process.

Condensates from the multiple-effect evaporator and blow heat recovery system may contain a considerable amount of foul-smelling compounds and give rise to a secondary nuisance, depending on their need of disposal.

The literature contains a great many proposals for odor control and elimination systems. Some of these would undoubtedly have been reasonably effective but their cost precluded their ever being tried. It is, for example, generally uneconomic to install extensive ducts through which all malodorous gases can be conducted to a control point for treatment. Other processes have been fully effective in controlling the odor from one source but have not abated the general nuisance because they have left major points of release unaffected.

A.P.W.

ONLIWON

INDUSTRIAL
TOWELS
TISSUE

The first important step towards an effective solution was made some years ago when Bergstrom and Troebeck showed that "black liquor oxidation" was effective in reducing the release of odor in the multiple-effect and cascade evaporators, and also, under certain conditions, the amount released in the furnace. It had, of course, no effect on the amount of malodorous material from the digesters. It was also reported that oxidation had other advantages including improved sulphur recovery and reduced corrosion in the recovery system.

It is well known that sulphate black liquor has a marked affinity for the air, particularly at elevated temperatures, and Bergstrom and Troebeck showed that a major part of the oxygen taken up is used in oxidizing the mercaptans and inorganic sulphides. The organic constituents of the black liquor appear to act as catalysts.

The term "black liquor oxidation" has been applied to this process. It is, of course, only a partial oxidation since only certain constituents of the liquor are oxidized. Complete oxidation only takes place in the recovery furnace. Tomlinson and his co-workers have used the term "black liquor stabilization" to describe essentially the same process.

Since the object of the operation is to fix volatile sulphur compounds in the liquor by oxidizing them in less volatile derivatives, the term "black liquor fixation" appears to be more accurate.

Early in 1948 the British Columbia Research Council undertook an investigation of the problem of odor control on behalf of a group of Canadian pulp mills. After a survey of the literature, black liquor oxidation or fixation was selected as offering the most promising point of departure.

Work was started simultaneously on two aspects of the problem. A rapid and convenient method of analyses for hydrogen sulphide and methyl mercaptan was developed, and the kinetics of the oxidation process were studied.

It was shown that sodium sulphide and mercaptans in the black liquor are among the first substances to be oxidized, and that oxygen absorption continues indefinitely thereafter but at a steadily diminishing rate. As a further result of these kinetic studies it was shown that the process of sulphur fixation requires a certain time of exposure regardless of the area of the air-liquor interface. In other words, there is a chemical resistance lying in wait behind the physical resistance of the phase boundary. It follows that there is nothing to be gained by increasing the superficial area of the liquor beyond a certain point.

On the basis of these considerations attention was then directed to the design of an oxidation apparatus which would give optimum values to both the area and the time of contact, between the black liquor and the air.

A tower packing was eventually developed which appears to be cheap, durable, and remarkably effective. The black liquor produced when certain species of wood are pulped has a strong tendency to generate large amounts of very troublesome foam. In order to avoid the complications involved in a foam breaking apparatus, special attention was given to producing an oxidation apparatus in which foaming would not take place.

This unit was operated satisfactorily and no difficulties from foaming were encountered even when running at a very considerable overlead.

The primary purpose of the fixation process was odor reduction. To ensure that the spent air discharged from the apparatus would not be a source of odor nuisance, concurrent flow of air and black liquor was used. In this way, malodorous material which might be liberated from the fresh black liquor entering the unit and taken up by the air stream there, was reabsorbed and fixed in the oxidized black liquor farther along.

In a special series of experiments, non-condensable digester gases were added to the air supply to the unit, giving concentrations of methyl mercaptan as high as 15 milligrams per liter. These gases were practically completely absorbed and the air leaving the apparatus carried little if any of the characteristic kraft odor. It therefore appears that the system is capable of absorbing and fixing the malodorous constituents of the digester gases very effectively.

A trial run of fixed black liquor through the recovery system of the mill gave evidence of a very great reduction in the amount of odor released in the evaporation and combustion of the black liquor.

The trials with this tower therefore

(Continued on page 42)

RIGHT IN YOUR OWN BACK YARD... BY WEST

MOPWELL, BEST CLEAN-UP ON THE TEAM, SHOWS THE VISITING FIREMEN A FEW TIMESAVING TRICKS··· THANKS TO LUSTRECLEAN
BURSTLY BOILER COMPANY CAFETERIA
15¢ 35¢
NOW YOU SEE GENTLEMEN, LUSTRECLEAN WASHES AND WAXES IN ONE SIMPLE OPERATION··· SAVING ME HOURS EACH WEEK FOR BOWLING, TELEVISION, LOAFING AND OTHER PLEASANT ACTIVITIES···
AND YOU'LL NOTE, I DON'T EVEN USE A SCRUBBING BRUSH···
AND TO THINK I'VE BEEN WEARING MY MOPS DOWN TO THE HANDLE··· WHEN I COULD HAVE BEEN USING LUSTRECLEAN THAT REQUIRES NO RINSING. AND LISTEN TO THIS··· IT'S GOOD FOR WOODWORK TOO···
LET'S BLACKBALL MOPWELL OUT OF THE BOWLING LEAGUE FOR NOT TELLING US ABOUT LUSTRECLEAN··· THAT IS, UNLESS HE BUYS THE BEERS NOW THAT HE'S ALMOST THROUGH···
IT LEAVES A SURFACE CLEAN AS A FROZEN MILLPOND!

THE MORAL TO OUR STORY? Make the job easier for your maintenance personnel . . . and you *automatically* lower your maintenance costs. Let 'em wax as they clean—with a specially formulated material that performs 3 operations in one!

LUSTRECLEAN (pine-scented or plain) cleans . . . deodorizes . . . and deposits a light film of wax. Effective on any type of surface! No heavy scrubbing. No rinsing. Mop dry . . . buff the film lightly if a soft satiny finish is desired! Save time and labor cleaning floors, walls, woodwork—wherever excessive wear and heavy traffic has made daily maintenance a back-breaking job.

LUSTRECLEAN really cleans! Its emulsifying action loosens the most persistent dirt, grime . . . hard-to-remove rubber burns. No need to use harsh soaps or injurious chemicals. Proof? Ask for a sample and test it on the spots and blemishes your present cleaner won't remove!

Pine Lustreclean is only one of many WEST products formulated for the promotion of sanitation. Others include floor sealers and waxes . . . washroom service . . . disinfectants . . . deodorants . . . insecticides . . . cleaners . . . soaps . . . protective creams. West is the exclusive distributor of Kotex Sanitary Napkins sold through vending machines.

WEST DISINFECTING Company

42-16 West Street
Long Island City 1, N. Y.
(64 BRANCHES IN U.S. AND CANADA)

SAVE $ $ $ . . . WAX as you WASH

I'd like to try a sample of Lustreclean

Pine-Scented ☐ Plain ☐

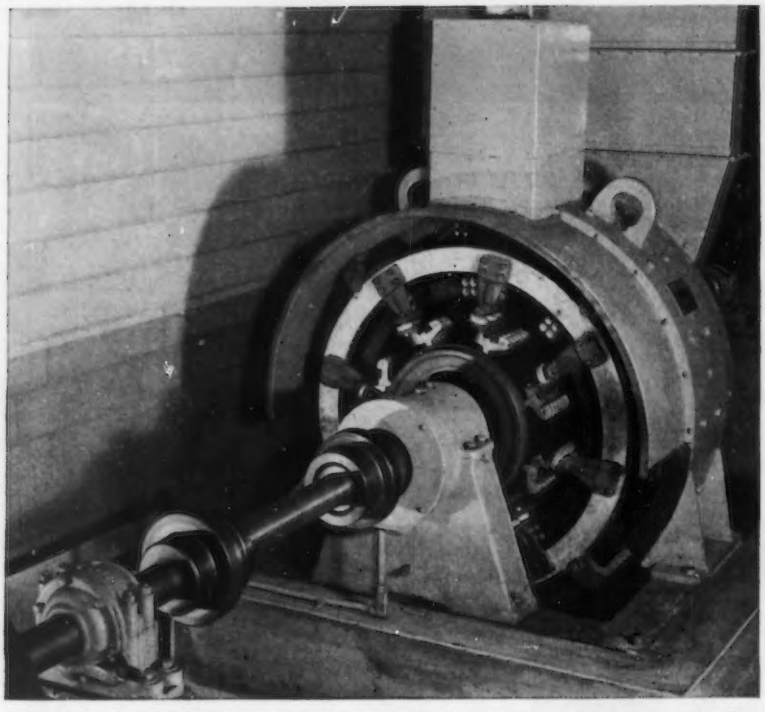
Name_____ Title_____

Company_____

Address_____

City_____ Zone_____ State_____

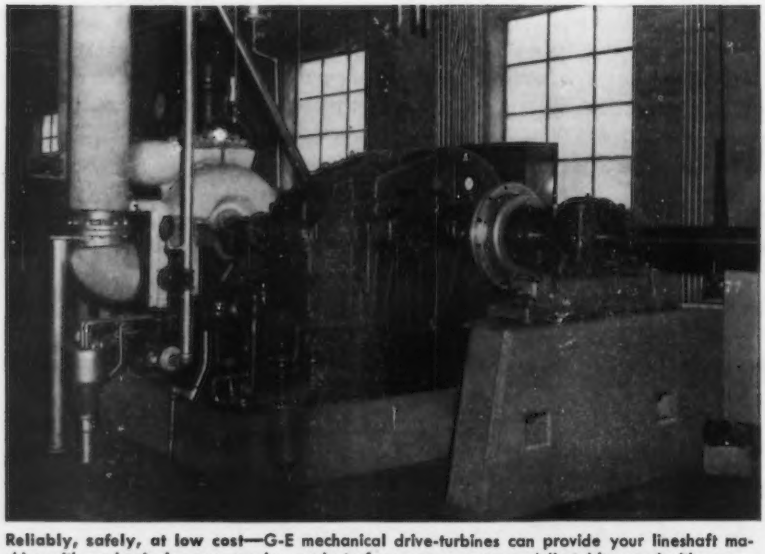
Dept. 43



Regardless of load changes, any pre-set speed can be kept with pinpoint accuracy by G-E single-motor drives for lineshaft-driven machines. Simple, flexible operation—with speed ranges up to 10:1 or higher—helps maintain uniform weight and quality of the sheet. At the Camas, Wash., paper mill of the Crown-Zellerbach Corp., this G-E main drive motor for the No. 15 paper machine is rated 900 hp, 600 rpm, 600 volts.

Supplying power to motor at left is this G-E main motor-generator set, including 750-kw d-c generator, 1250-hp synchronous motor, 150-kw auxiliary generator, and 25-kw d-c exciter. All are mounted on a common base for easy installation.

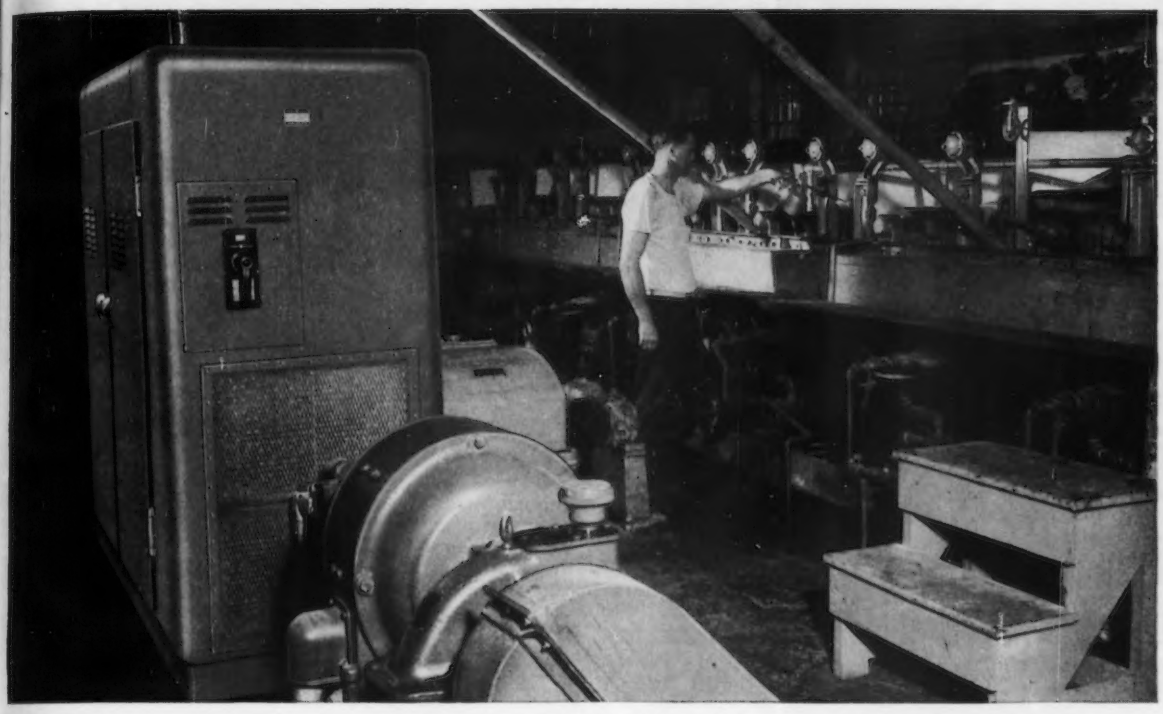
Get more paper from your



Reliably, safely, at low cost—G-E mechanical drive-turbines can provide your lineshaft machine with mechanical power as a by-product of your process steam. Adjustable speed with ranges up to 10:1 or higher are provided with great accuracy by their governors. At the Lewiston, Idaho, paper mill of Potlatch Forests, Inc., one of these G-E units—rated 1750 hp, 7000/450 rpm—is shown driving a paper-machine lineshaft.

CO-ORDINATED PAPER-MILL DRIVES

NEW! G-E Motor Selection and Application Course—timed to meet today's needs—can help train your paper-mill employees, increase their efficiency. A G-E "More Power to America" program, it shows how motors work, types now in use, how to select and apply them for specific jobs. Bulletin GEA-4938-16 describes the course in full. ***Write for it!***



For smaller horsepower drives, easy low-cost installation is one big reason why more and more paper-mill operators are using the G-E Speed Variator single-motor drive. An adjustable-voltage d-c drive operating from a-c power, it includes a packaged power unit that's easy to install, maintain, and re-locate if necessary. At the Bay State paper mill of Crane & Company, Inc., Dalton, Mass., the compact, enclosed Speed Variator power unit—shown here behind its G-E 40-hp d-c motor on a lineshaft-driven paper-making machine—"makes for smoother operation all the way through," say company engineers.

lineshaft-driven machines!

One of these General Electric drives—correctly engineered to your needs—can bring out the best in your lineshaft-driven machines, increase your output of uniform-quality paper!

Which drive will do the most for *your* lineshaft-driven paper machines—in raising output to your paper machine's top capacity, maintaining a uniform high-quality sheet, and keeping your paper-making costs down?

It's a problem that can't be solved the same way every time. That's why General Electric offers paper-mill operators a choice of lineshaft drives shown on these pages. With this variety—and with an experienced G-E paper-industry engineering specialist helping in your selection and application problems every step of the way—you're sure of an answer that's *right for you.*

It may call for holding desired speed with great accuracy, either with a G-E single-motor drive or with an efficient G-E mechanical drive turbine to generate mechanical power and supply process steam. In either case, you'll get the right combination of speed-control and sensitivity, the speed range desired, and a drive that's easier to operate, provides top reliability, and requires less maintenance.

To get more paper from your lineshaft-driven machines, get in touch with your G-E paper-mill specialist—now!—at your nearest G-E office. Meanwhile, send for Bulletin GEA-5288 on single-motor drives. *General Electric Company, Schenectady 5, N. Y.*

GENERAL ELECTRIC

655-10

GOVERNMENT GOSPEL

M-72 Amended

WASHINGTON, D. C. — Allowable inventories of North American unbleached kraft pulp were raised last week to 60 days' supply, instead of 45, in an NPA action changing various restrictions on inventories of chemical wood pulp. The increased inventory figure is based on the estimated consumption of that grade in the first six months of 1952.

Other changes: Permit carry-over from one quarter to the next of unused authorized consumption of market chemical wood pulp up to ten percent of base consumption; method of reporting monthly wood pulp production changed from a telegraphic to a by-mail form report. A report also must be filed with NPA showing estimated consumption in the first six months of 1952.

The NPA also provided an alternative base period for allowable consumption in the first quarter of 1951, as compared with the previous provision of one-fourth of total usage during the calendar 1950 year.

The provision allowing paper mills to carry over, from one quarter to another, their unused authorized consumption of chemical pulp has been changed to restrict the carryover to ten percent of base consumption.

The nature of controls imposed in M-72, the chemical wood pulp order, is not changed, NPA pointed out, only modified in the light of experience in operating the order.

Report on Value of Paper and Allied Products

WASHINGTON, D. C.—Paper and allied products manufacturers in the Middle Atlantic States showed $814,081,000 in value added by manufacture for the year 1950, according to the Bureau of Census in its series on manufacturing activities for that year.

The average number of all employes in the industry in the area for that year was 123,549. By states, the report showed value added by manufacture as follows: New York, $416,482,000; New Jersey, $160,134,000; Pennsylvania, $237,465,000.

For comparison, value added by manufacture in the entire Middle Atlantic area totaled $677,626,000 in 1949, and there were 119,198 employes. In New York, value added amounted to $341,851,000 for 1949; in New Jersey, $31,916,000; and Pennsylvania, $198,819,000.

Reporting in the same series for Pacific Coast states, the Bureau said value added by manufacture in the paper industry of those states in 1950 totaled $318,402,000 compared with $255,768,000 in 1949; number of employes totaled respectively, 35,310 and 31,424; for the individual Pacific states, value added by manufacture was shown as follows: Washington, $155,579,000 and $127,649,000; Oregon, $43,347,000 and $41,029,000; and California, $119,476,000 and $87,090,000.

Containers and Packaging Quarterly Report

The supply of containers and their demand are more nearly in balance now than at any time since June, 1950, according to the NPA.

Brief summaries of some categories covered by the quarterly report are:

Corrugated and Solid Fibre Shipping Containers—A plentiful supply of paperboard placed the industry in a favorable position to meet the demand which increased slowly in the latter part of the third quarter and which is expected to continue strong into the first quarter of 1952.

Paper Shipping Sacks — Shipments for the first nine months of 1951 were about 19 percent greater than the same period of 1950. Third quarter demand was heavy and is expected to continue strong. Paper inventories at bag plants continued low although a slight easing of supply was noted.

Fibre Drums—Demand was slow but a slight increase was noted during the latter part of the third quarter as some steel drum users changed to fibre drums. Raw material supplies were adequate to meet production needs. Order backlogs were reduced during the quarter.

Fibre Cans and Tubes — Production dropped as a result of easing demand. The paperboard situation improved considerably with metal for can ends, tops and spouts remaining the major raw materials problem.

Bulk Ice Cream Containers — Shipments were slightly below 1950 levels. Supplies of raw materials were adequate to meet demand.

Liquid Tight Paper Containers — Shipments were approximately 30 percent below the same period of 1950, primarily because of previous overbuying by customers. Fourth quarter shipments may be still lower. Order backlogs were nonexistent.

Special Food Cartons and Paper Pails—Shipments averaged between 85 and 90 percent of the same period of last year. The end of the third quarter showed almost normal inventories. An increase in activity is expected during the fourth quarter. Raw material supplies were free. Frozen food carton shipments in 1951 are expected to be about 15 percent higher than last year.

Folding Paper Boxes—An abnormal drop in shipments during September was attributed to customer's heavy box inventories. A total of 539,807 short tons of folding boxboard was produced which was 167,088 short tons less than the total for the previous quarter.

Set-up Boxes—Production of set-up boxboard was 159,800 short tons which represented a six percent increase over the third quarter 1950. This, however, was a substantial drop of 42,587 tons or 21 percent, from the second quarter of 1951. Kraft paper remained scarce but other paper and board were more readily available by the end of the quarter. Metal requirements were adequately met.

Paper Bags—Production of bag paper decreased 1,222 tons from the second quarter after a continuous rise since the fourth quarter of 1950. Kraft bag paper output was 14.4 percent over the 170,968 tons produced in the third quarter of 1950.

Paper Milk Containers—Heavy demand, principally from defense plants, continued to exceed supply. Shipments rose 25 percent higher during the first nine months of 1951 as compared to the same period of 1950.

Paper Cup and Nested Food Container—Third quarter shipments were slightly below the same period of 1950. The paper supply was in approximate balance to meet requirements.

Taxes and Profits Down

The Federal Trade Commission reports Pretax profits for Paper and Allied Products declined from the $410 millions to $323 millions or 21 percent from the second quarter to the third quarter 1951. After tax profits declined from $166 millions to $123 millions or 26 percent during the same period.

Canada Resale Opinion

OTTAWA—As far as the pulp and paper industry is concerned, the Canadian Government's bill to outlaw resale price maintenance will still allow a manufacturer to suggest the retail prices for his products but he will be unable henceforth to force the retailer to maintain such prices.

Justice Minister Stuart Garson told Parliament that it will be an offense under the new law for a manufacturer or dealer to prescribe fixed or minimum resale prices. He may still prescribe and enforce maximum resale prices.

Fair Trade May Be Out

OTTAWA — Of interest to the pulp and paper industry is the report here that the Canadian Government's bill to outlaw resale price maintenance contains a penalty for violations of a maximum $10,000 fine or two years imprisonment for an individual and a maximum fine of $25,000 for a corporation.

The Government's bill aims to do away with resale price maintenance as a practice so that a manufacturer or supplier cannot set the price at which his goods may be sold to the general public.

DESIGN DETAIL Sales and Engineering Departments cooperate to insure that each machine will meet the specific needs of the mill. Al Olson (*left*) and Dick Smith (*right*) check with C. E. Bieber, Chief Draftsman, as to placement of doctors. Personal attention to design detail is an essential ingredient in the building of every high-speed, high-production Beloit paper machine.—*Beloit Iron Works, Beloit, Wis.*

BELOIT

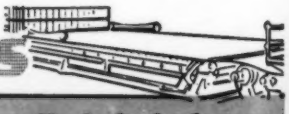
PAPER MACHINERY

WHEN YOU BUY BELOIT... YOU BUY MORE THAN A MACHINE!

Determination...

OTHERS may call it initiative. The meaning is always the same—*a determination to progress.* Since 1903, product improvement has been uppermost in Lindsay policy and will so continue. Our ploughing back into research will expand year by year for the purpose of contributing more and more to the excellence and performance of Fourdrinier wires and hence to the quality of paper . . . The Lindsay Wire Weaving Company (Serving the Paper Industry Since 1903) • 14001-14229 Aspinwall Avenue, Cleveland 10, Ohio.

Lindsay **WIRES**



FOR PAPER MILLS

THIS STORY

MAY SAVE YOU

Thousands of Dollars

Research Corporation Offers

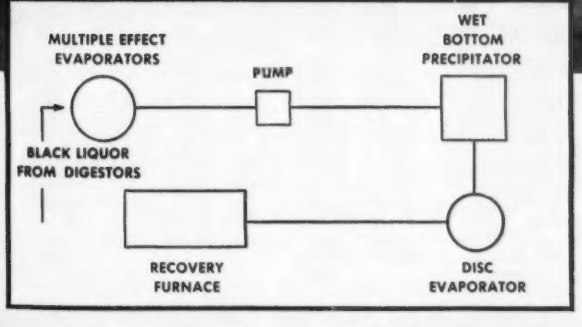
WET RECOVERY SYSTEM

for Electrical Precipitators

A shortcut in the recovery of chemical compounds from Recovery Furnace Stack Gas offered by Research Corporation, assures an appreciable saving in operating and maintenance cost. That's because the new Wet Recovery System gets the precipitated dust into the black liquor as soon as possible after it has been removed from the gas.

Instead of collecting dust in hoppers at the bottom of the precipitator and conveying it, in the dry state, to black liquor tanks, the new method utilizes a liquor sump or tank directly under and an integral part of the Cottrell Precipitator. Black liquor flows to this wet bottom where the recovered dust is taken up in solution or suspension. In this continuous process, the black liquor discharges to the feed going to the disc evaporators.

The Wet Recovery System does away with handling dust in the dry state. It eliminates steam coils and heat insulation formerly needed to prevent condensation in the hoppers. It obsoletes such expensive equipment as hopper vibrators and steam-jacketed conveyors.



COMMERCIAL installations have proved the economy of this new system. They have demonstrated, too, that dust collection efficiency remains as high with the wet recovery system. For complete data, write for Editorial Reprint P-1.

RESEARCH CORPORATION

405 Lexington Ave., New York 17, N. Y.
122 South Michigan Avenue, Chicago 3, Illinois
Bound Brook, New Jersey

RC-132

Sulphur M-69 Amended

As amended December 29, 1951, M-69 sulphur users are:

1. Restricted to 90 percent average monthly use of sulphur, during the base period of the year ending December 31, 1950.

If less than 90 percent is used, the difference may be used during the next succeeding 5 months.

Sulphur mined or recovered is exempt from restriction if the equipment has been installed and put into production since June 24, 1950, and if it is used by the person who mines, recovers or owns the material from which the sulphur is recovered.

2. No person shall receive sulphur if his inventory is in excess of 25 days' supply or by such receipt 25 days or the minimum working inventory (NPA Reg. 1), whichever is smaller.

Barge and vessel delivery can be accepted if the inventory does not exceed 25 days, and this type of delivery was customary during the base period, and no further delivery is taken until the inventory is again reduced to 25 days.

3. Consideration will be given for exemption or adjustment if the consumer's conditions are different than those of his industry, and will be judged on a basis of requirements effecting public health and safety, civilian defense, dislocation of labor, and employment effecting national defense.

Freight Rate Decision Not Revealed

OTTAWA—The pulp and paper industry of Canada will not know the decision of the Board of Transport Commissioners regarding the request of the railways for a new 10 percent increase in freight rates for some time since the Board has reserved its decision after more than three weeks of argumentation by representatives of the railways and eight of the provinces which oppose the new boost, estimated to involve $44,500,000 a year.

Canadian Imports and Exports

OTTAWA—Canadian Government announces exports of woodpulp continued to increase and reached $34,648,000 in October, 1951, as compared with $21,610,000 in the same month a year earlier, totaling $299,456,000 in the first ten months of 1951 as against $165,362,000 in the corresponding period of 1950.

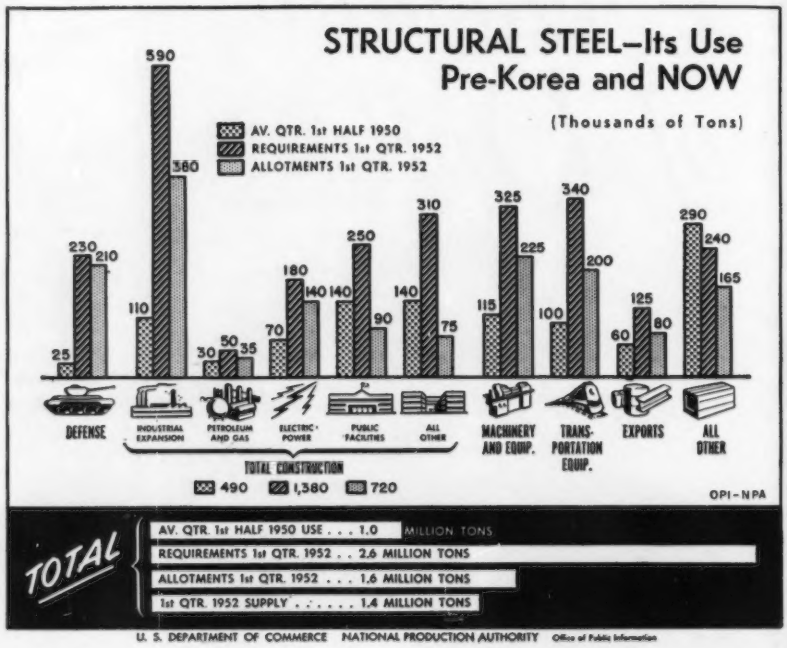
Likewise, exports of newsprint paper advanced to $50,122,000 during October, 1951, as against $49,008,000 in this month of 1950 and totaled $445,406,000 in the first ten months of 1951 compared with $402,964,000 in this period of 1950. Similarly shipments out of Canada of other paper increased to $3,467,000 in October, 1951, as against $2,086,000 in October, 1950, reaching a cumulative total of $30,269,000 in first ten months of 1951 as against only $14,335,000 in the same period of 1950.

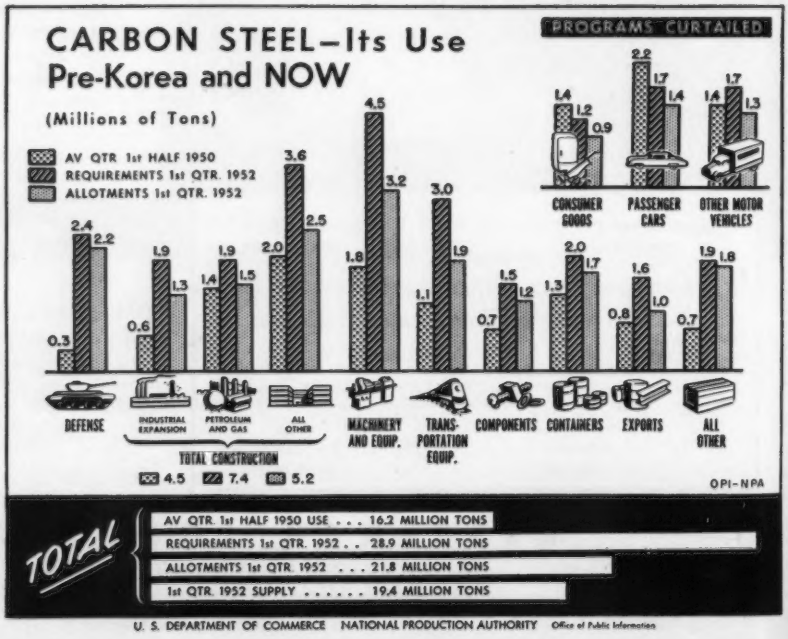
Imports into the Canadian market of paper moved up to $3,536,000 during October, 1951, as against $2,182,000 in the same period of 1950 and totaled $28,754,000 in the first ten months of 1951 compared with $18,687,000 in the corresponding period of 1950.

New Finnish Pulp Mill

Stadler, Hurter & Co., consulting engineers, Montreal and New York, are completing their contract for the designing of a 350 ton daily capacity sulphite pulp mill for Kymmene Aktiebolag, Kuusankoski, Finland. While major equipment has been ordered from European manufacturers, approximately $300,000 worth of auxiliary equipment is being purchased in the U.S.A. through their New York office.

Stadler, Hurter & Co. have also designed, for the same company, an extension to their steam generating plant at Woikka, Finland. The new boiler is being manufactured by Combustion Engineering-Superheater Co., New York.





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COLUMBIA-SOUTHERN . . .
producer of essential chemicals for industry

SODA ASH
LIQUID CHLORINE
SODIUM BICARBONATE
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PHOSFLAKE • S.P. FLAKE
CLEANER AND CLEANSER
SODA BRIQUETTES
MODIFIED SODAS
CALCENE TM • CAUSTIC ASH
SILENE EF • HI-SIL
MONO-CHLOROBENZENE
ORTHO-DICHLOROBENZENE
PARA-DICHLOROBENZENE
BENZENE HEXACHLORIDE
MURIATIC ACID
PACIFIC CRYSTALS
PERCHLORETHYLENE
PITTCHLOR

For nearly half a century, shipments of caustic soda, made by the Columbia-Southern organization, have been rolling over the rails.

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Dynamic Balancing as Applied to a Paper Machine Breast Roll

A. Hillebrand

Engineer, Victorian Railways, Electrical Engineering Branch, Power Station Div.

SUMMARY

A brief general explanation of the cause and effect of both static and dynamic unbalance is followed by descriptions of various methods and equipment used for the correction of these faults in rotating machinery, particular attention being given to a description of the 'Davey' dynamic balancing equipment.

The paper then goes on to describe the procedure of finding the cause of trouble experienced with a breast roll from No. 1 paper machine, Burnie mill, Associated Pulp and Paper Mills Ltd. The method of correcting the mechanical defects so found, and finally, the dynamic balancing of the roll, using the 'Davey' equipment, is covered in detail.

The paper is illustrated with diagrams and drawings, including vibrograms which show the initial amplitudes of 0.0105 in. finally reduced to amplitudes not exceeding 0.0010 in.

INTRODUCTION

A wealth of information is available in various text books and technical journals which will supply ample material to those members wishing to study the theoretical aspect of vibration. It is not the author's intention therefore to deal at any great length with the purely academic side of this subject, but to confine his remarks mainly to the practical difficulties which were encountered, and to the methods adopted to overcome them, when engaged in balancing a breast roll from the Burnie mill of Associated Pulp and Paper Mills Ltd.

However, in order to refresh the memories of those at present out of touch with the practice of balancing in the field, and to help make clear to those engaged in other branches of the engineering profession the reasons behind the various stages of the procedure, it is felt that a short explanation of the causes and effects of unbalance in rotating machinery will not be out of place.

Presented at the 4th General Conference of the Australian Pulp & Paper Industry Technical Assn. in Melbourne.

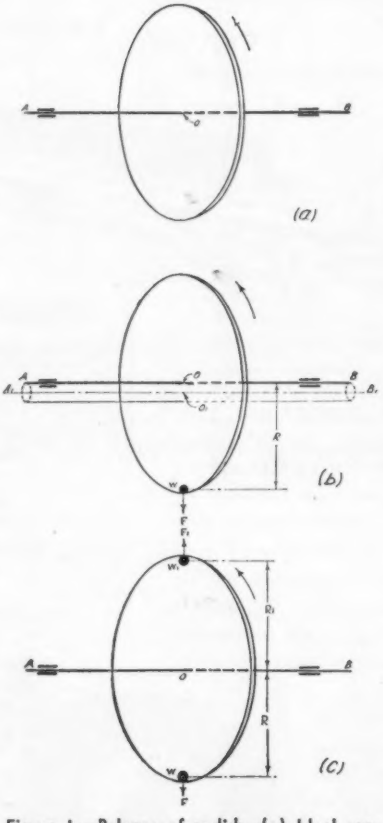


Figure 1.—Balance of a disk—(a) Ideal condition; (b) Presence of static unbalance; (c) Unbalance corrected

The development of large machines of all kinds has given impetus to the production of equipment designed to take the 'guess work' out of field balancing. This is because it is not often a practical proposition to return large rotors to the works of the original manufacturers for correction of unbalance which may develop in service. Again, shop balancing is not always the most satisfactory from the point of view of the maintenance engineer, as it is carried out at some fixed speed (determined by the equipment available) which may or may not be that speed at which the plant is generally operated.

On the other hand, field balancing can usually be carried out at the operating sped and without dismantling the plant.

For the foregoing reasons it is of interest that a short description be included in this paper of the various methods of balancing *in situ*, with particular reference to the 'Davey' dynamic balancing equipment which has been used by the author for the dynamic balancing of turbo-alternators and other equipment.

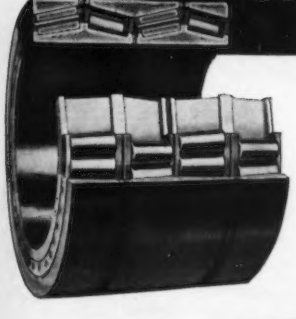
UNBALANCED ROTATING MACHINERY

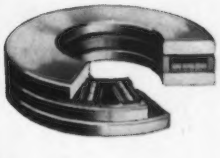
Unbalance in rotating machinery gives rise to several undesirable effects, the main evidence of which is noise and vibration. Vibration is the cause of rapid wear or even failure of bearings, and the fracture of small parts such as gauges, oil pipes, etc., and in extreme cases can cause cracking and crumbling of foundations. In some instances vibration may also seriously affect the quality of the product of the particular plant involved, and in the paper industry it can well be imagined that this would be the case.

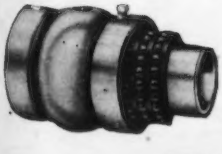
Noise in the manufacturing plant has been too often regarded as a necessary evil, but it has been proved that if unnecessary noise is eliminated, employes suffer less from nervous fatigue, with a consequent improvement in output.

Static Unbalance

Static unbalance is the form of unbalance which is most easily detected, and also which, when it occurs in a







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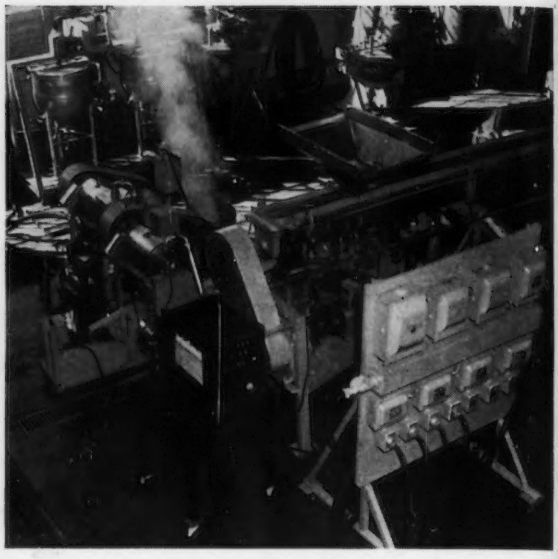

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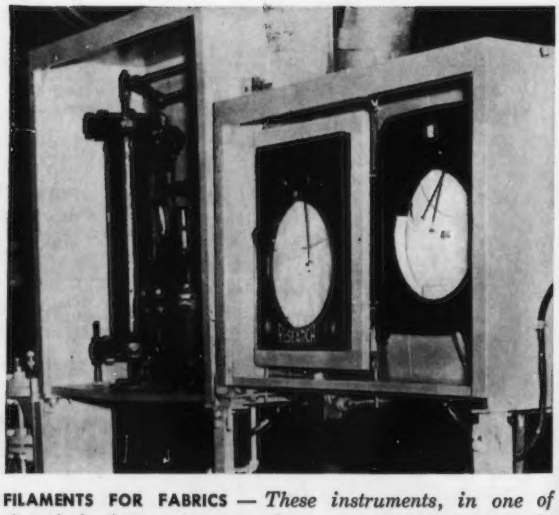

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short rotor such as a disk, may be most easily corrected.

Consider a disk such as that shown in *Figure 1.*

If the material from which it is made could be considered to be absolutely homogeneous, and the machining of a degree of accuracy to make the disk perfectly symmetrical about the shaft A-B, then the spindle A-B would pass through the geometrical centre of the disk at O and be truly perpendicular to the plane of the disk surface. When a disk such as this is rotating at any speed all forces of inertia set up by its mass are in equilibrium and no forces other than those acting on the rotor when it is stationary will act on the bearings. In this ideal case the supporting axis A-B and the principal axis of inertia are coincident, and no vibrations are present, the disk being in perfect static and dynamic balance as shown in *Figure 1 (a).*

Unfortunately this ideal condition is practically unobtainable, as no material is truly homogeneous and no machining can be said to be without at least small inaccuracies. We have then, in practice, the same disk as shown in *Figure 1 (a)* but with an out of balance mass W at radius R from the supporting axis A-B which passes through the geometrical centre of the disk at O as shown in *Figure 1 (b).* The centre of gravity has now moved to O_1 towards the unbalance of W and the principal axis and the supporting axis are no longer coincident.

Suppose that the bearings are mounted in some resilient material such as sponge rubber, or are supported by springs. Now, if we rotate the disk, the forces of inertia are no longer in equilibrium, and the mass W exerts an unbalanced centrifugal force F. The disk now tends to rotate about its principal axis of inertia or free axis A_1-B_1, *(Figure 1 (b))* which is parallel to its supporting axis A-B and passes through the center of gravity. The bearings being free to move, their centers will describe circles when the disk rotates above its critical speed, and the deviations will be in the same direction and of the same magnitude at each bearing at any instant.

When the bearings are of the usual

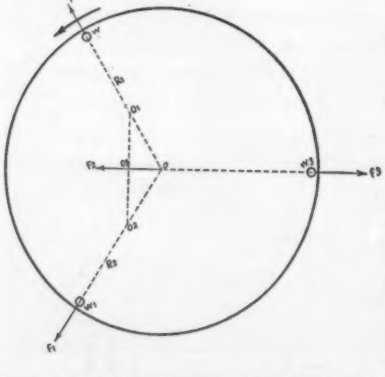

Figure 2.—Effect of incorrectly placed balance weight

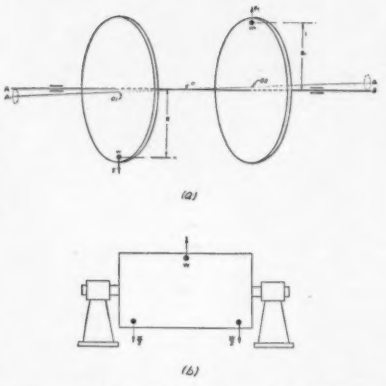

Figure 3.—Examples of dynamic unbalance

type, however, and do not allow movement of any great magnitude to take place, forces of reaction are set up, and as no bearing is perfectly rigid, it is clear that we have vibrations appearing which are entirely due to static unbalance.

The unbalanced moment WR can be corrected by adding a weight W_1 at radius R_1 180° from W and of such magnitude and location that $WR = W_1R_1$. This will restore the center of gravity to its original location of coincidence with the geometric center at O, and as $WR\pi^2 = W_1R_1\pi^2$, F_1 now equals F, equilibrium is restored and vibration will disappear. This condition is shown in *Figure 1(c).*

If, however, WR is not equal to W_1R_1 or W_1 is not exactly 180° from W, the center of gravity will move to another position and further weight must be added to balance the disk. *(See Figure 2).*

In the past, in fact even at present, most machine shops detect and correct for static unbalance by mounting the rotor to be balanced on knife edges or parallel "ways." The rotor will come to rest with the heavy spot at the under side and weights are added to the upper side until the rotor will remain still in any position in which it is placed.

This method is satisfactory up to a point, especially for light rotors, but when heavy gear is involved the width of rail required to support the weight increases the friction at the journal contact to the point where accuracy of balance is very difficult to secure.

Most rotors take the form of a cylinder or drum rather than a disk, which we have been considering up to the present; and in these circumstances, unless the corrective weight is placed in the same radial plane as the unbalance, static balancing can become worse than useless unless further information than can be obtained by the use of knife edges is available, as dynamic unbalance may easily be introduced.

Dynamic Unbalance

If we now add a second disk as shown in *Figure 3(a)* to the spindle A-B which we have been considering, it is clear that any unbalanced mass W on one disk can be statically balanced by a weight W_1 placed on the second disk at an angle of 180° from W.

The only requirements for perfect static balance in this case are exactly the same as for the single disk, namely, that $WR = W_1R_1$ and that W and W_1 be 180° apart. However, if we now rotate this assembly, dynamic unbalance will immediately become evident.

Again assuming the bearings to be mounted resiliently the whole assembly will tend to rotate about its free axis A_1-B_1 which passes through the center of gravity of each disk at O_1 and O_2 respectively.

The weights W and W_1 being in this case 180° apart, the free axis will cut the supporting axis A-B at O, the center of gravity of the whole system; and the ends of the fixed or supporting axis will describe circles as indicated in the figure.

One important difference between the motion of the bearings in this case, as compared with that resulting from static unbalance, is that where in static unbalance both ends of the spindle move in the same direction at any given instant, they move in opposite directions in the case of the dynamic unbalance illustrated.

If WR is not equal to W_1R_1, or the angle separating W and W_1 is not exactly 180°, we have a combination of static and dynamic unbalance. This is the most common form of unbalance met with in practice.

Passing now to *Figure 3(b)* we have the more usual type of rotating member found in electrical or papermaking machinery.

From the foregoing remarks it will be apparent that an unbalance anywhere along one side of a drum or cylinder may be both statically and dynamically balanced by adding a correctly proportioned balance weight diametrically opposite to, and in the same radial plane as, the unbalanced mass. This desirable result is difficult to achieve, as generally weights can only be attached in planes near the ends of the rotor. Therefore, if the unbalance is at the center of the length of the roll, half the corrective weight necessary should be added at each end; and for any other axial position of unbalance correct proportioning of the weights between the balancing planes will achieve the required result.

This latter statement is strictly correct only for rotors of extreme stiffness and which do not deflect further as the speed and consequently the centrifugal forces increase. In practice it is found that more weight than that stated above has to be added, and even then, for flexible rotors, true balance can only be obtained for a given speed.

This is one reason why shop balancing (i.e., balancing at manufacturers' works) is not always satisfactory unless carried out at operating speed.

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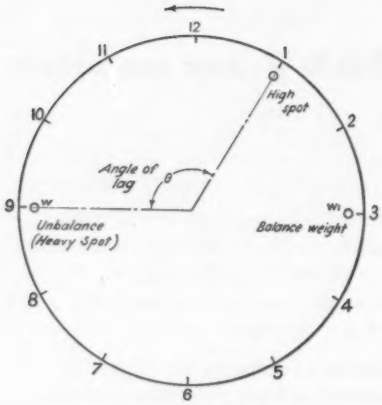


Figure 4.—The angle of lag

Shop balancing is often done at speeds of from 200 to 400 rev./min. for machines designed to be operated ultimately at from 1,500 to 3,000 rev./min. As the magnitude of centrifugal force due to unbalance increases as the square of the speed, this means from 14 to 225 times greater forces will act under operating conditions than will be present during balancing. If the rotor is at all flexible, balance at speed will be unsatisfactory; and even for very stiff rotors deflections which appear of negligible amplitude during balancing may become severe in service.

GENERAL BALANCING PROCEDURE

We have now seen that unbalance, whether static or dynamic, gives rise to rotating forces acting on the supporting bearings. These forces result of course in equivalent bearing reactions, and depending on the stiffness of the bearing housing, vibrations of greater or lesser magnitude are set up in the machine. The deflections of the bearings may be resolved into vertical and horizontal components which vary in magnitude in accordance with the elasticity of the structure in these respective directions. One characteristic of these vibrations which we have not yet considered is the phase relationship between the passing of the "heavy spot" through the vertical or horizontal centerline of the bearing and the resultant deflections in the corresponding direction. This relationship varies for each particular machine, and is dependent on the physical characteristics of the rotor, the speed at which it operates, and the bearing elasticity.

Figure 4 shows a typical case in which W is the original unbalance and the angle θ is the angular distance through which the rotor turns before the deflection due to the passage of this unbalance W reaches maximum amplitude. This angle θ is known as the "angle of lag" and the point of the rotor in phase with the point of maximum bearing deflection is known as the "high spot." The corrective weight W_1 is of course situated 180° from the "heavy spot."

The curve shown in *Figure 5* indicates the relationship which exists between the "angle of lag" and the speed of rotation. For different rotors the gradient of the curve changes somewhat, but it is always of the same general form.

It will now be clear that in order to balance a rotor is at least necessary to have knowledge of

(a) the magnitude of deflections occurring at the bearings, and

(b) the location of the "high spot."

To obtain these data many types of machines have been designed, all more or less along the same general principles, but differing somewhat in detail and application. These instruments are of very great assistance in accurately determining the values required, and take the guess work out of the process which for many years has been carried out by what has become known as the "pencil method."

Before passing to the balancing of the particular breast roll with which we are mainly concerned, a brief description of some of the methods and instruments in general use may be of interest.

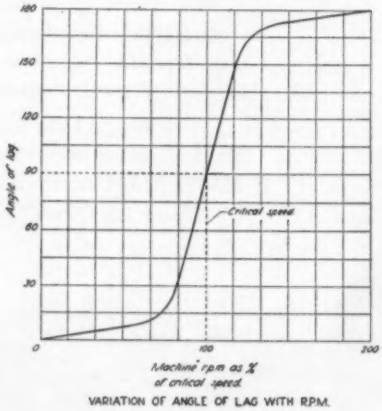


Figure 5.—Relationship of angle of lag to speed

SHOP BALANCING

Despite earlier references to the shortcomings of static balancing, the method commonly adopted in turbine shops is first to statically balance the rotor on parallel "ways" and then to transfer for dynamic balancing to a machine of the following description.

The equipment consists primarily of a heavy bedplate and adjustable suspended bearing in which the rotor under test can be mounted; a small pendulum by means of which the amplitude of vibration can be measured; and a motor and clutch mechanism by means of which the rotor can be driven. The bedplate is a heavy casting with provision for mounting large pedestals at convenient centers to support the spindle under test. Each pedestal carries a large stirrup pivoted at the upper end in such a manner as to allow radial swinging within the limits set by adjustable stops.

The spindle to be tested is mounted on rollers carried at the lower end of the stirrup, and provision is made to drive it from an electric motor through the clutch mechanism.

The vibrometer rests on a platform attached to the stirrup and consists of a pendulum about 7 in. long pivoted at its upper end and carrying on the lower end a small shutter which swing across a scale graduated in tenths of a millimeter. A small lamp inside the housing allows the scale to be viewed through an optical eyepiece and the amplitude of pendulum swing to be noted.

In use, the spindle under test is mounted in the stirrup bearings, one stirrup is rigidly locked and the pendulum is mounted on the free stirrup. The spindle is then run up to a speed something above 200 rev./min. and the motor drive is disconnected and the spindle allowed to coast down. As the speed passes through 200 rev./min. a reading of the pendulum swing is taken. A test weight is then applied to the rotor and the process above is repeated. The weight is then tried in two other positions 120° removed from each other, and from the original position of the test weight. From the readings of pendulum swing recorded during these three tests, the size of weight required and its location is deduced. Final small adjustments to weight and position are then tried until the amplitude of pendulum swing is reduced to 0.2 mm. or less. Operations are then switched to the opposite end of the rotor and the above procedure is repeated. The disadvantages of this method of balancing have already been described.

BALANCING IN SITU

Pencil Method

Although this procedure has been largely superseded by the use of more modern equipment, there are numbers of "die-hard" engineers who still pin their faith to this method.

A section of shaft adjacent to a bearing is polished and the operator then attempts to find the "high spot" by resting his hand on the bearing housing and marking the shaft with

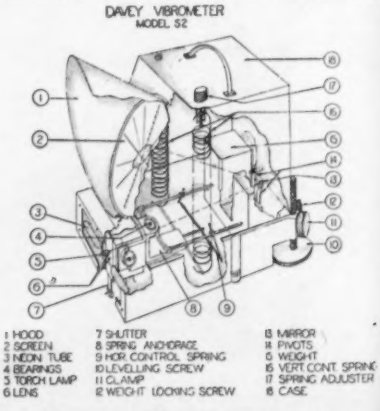
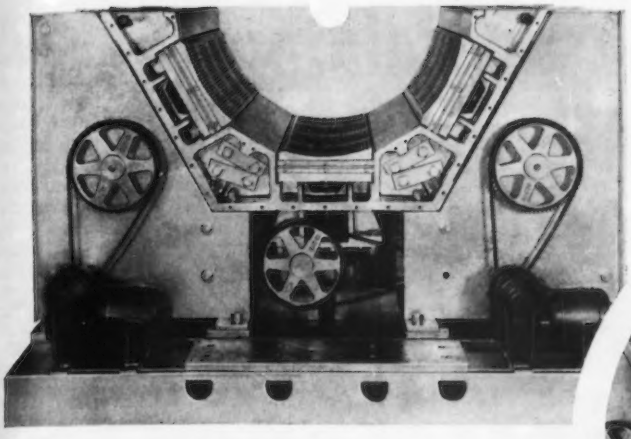
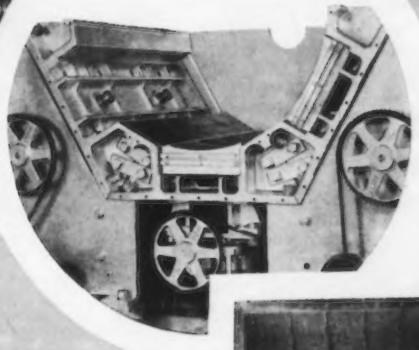


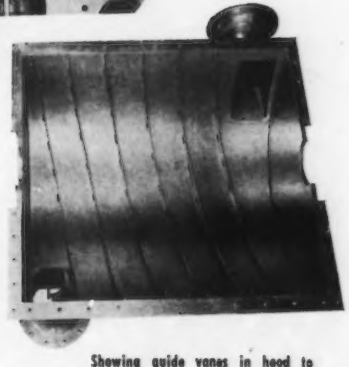
Figure 6.—The 'Davey' vibrometer



Bed plates in position.

One plate removed to show adjusting push rods. Each plate adjusted separately, with extreme precision.





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a pencil. The machine is then stopped and an inspection of the shaft is made with the object of seeing the pencil mark. This may extend over a large section of the shaft circumference, and in that case the center of the mark is taken to indicate the "high spot." A weight, judged by the operator to be sufficient, is attached to the rotor at a point which is hoped to be 180° removed from the point of unbalance. The machine is then run up to speed and by "sense of touch" the state of balance is judged to be better or worse.

This process is at best one of trial and error, and depends very largely on the human element for results. Differences of opinion are bound to exist as to whether improvement or deterioration has taken place after each weight change; and also from time to time during service, opinions as to whether or not a certain machine requires attention will differ widely.

Types of Modern Equipment

There are several types of modern portable equipment available for balancing in the field, all of which are designed with the object of obtaining accurately the essential data necessary for the correction of unbalance. These instruments are of substantial assistance when used correctly and are a great advance on methods previously described. Broadly, they may be divided into two types, viz., electric and seismic.

The 'Davey' Dynamic Balancing Equipment

Apparatus known as the "Davey" dynamic balancing equipment, which is of the seismic type, was used for balancing the breast roll from Burnie; therefore a detailed description is of special interest.

This equipment is essentially in two sections, namely, the vibrometer and the vibroscope which may be described as follows:—

The vibrometer (Figure 6).— This can be used alone to investigate the state of balance of a machine at any time without shutting down or interfering with its operation. The main body of the instrument consists of a cast aluminum box with sides about 6 in. long. It is provided with three feet, two of which are adjustable for leveling. Within the box is a relatively heavy weight, pivoted at the front in such a manner that it can move freely up and down and from side to side, but is normally held in equilibrium in the center of the box by means of spiral springs. Limit stops and an oil dashpot for damping are also provided. At the front of the box is an inclined removable ground glass screen suitably graduated, and, mounted below this, a 6-volt lamp of the focussing torch type, and a small neon tube. A lens system is arranged to focus light beams from these lamps on to a small circular mirror at the back of the box. This mirror is delicately poised between two points, one of which is connected to the box, and the other to the central weight so that any relative movement between box and weight causes movement of the mirror and consequent deflection of the light beam. When the instrument is placed firmly on the keep of a vibrating bearing, the case, being very light in weight, and having little inertia, moves with the bearing, while the internal weight, having relatively high inertia, remains practically stationary in space.

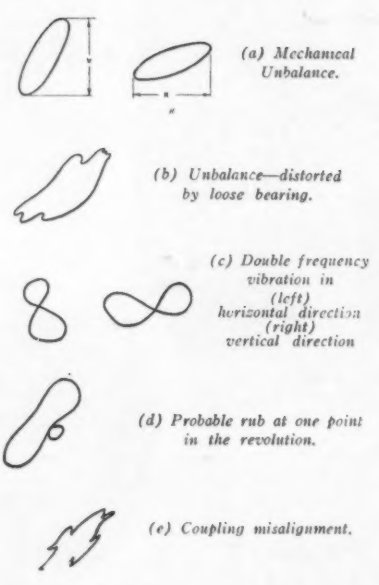
(a) Mechanical Unbalance.
(b) Unbalance—distorted by loose bearing.
(c) Double frequency vibration in (left) horizontal direction (right) vertical direction
(d) Probable rub at one point in the revolution.
(e) Coupling misalignment.

Figure 7.—Some typical Lissajous figures

It will be clear now, that the movement of the mirror causes the light beam to trace on the screen a figure which shows the deflections of the bearing due to the combination of the horizontal and vertical components of vibration. This figure is known as a "Lissajous figure," and, from the outline produced, a diagnosis of various troubles can be made.

Figure 7 gives an idea of some of the most common shapes, and indicates the information which is conveyed by their general character.

The instrument is so proportioned that 0.25 in. movement of the light beam indicates a bearing movement of 0.001 in., thus magnifying deflections 250 times. Provision is made for the fixing of a camera attachment in place of the ground glass screen so that records can be made and kept for reference. At any time the instrument can be set up, and it is immediately apparent whether deterioration in balance has occured. By turning the instrument through 90°, records of the combination of radial and vertical components or alternatively of axial and vertical components of the vibration present can be obtained.

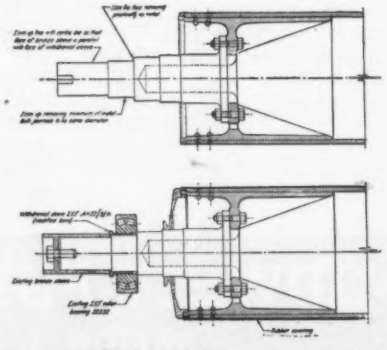

Figure 8.—Mechanical details of construction of breast roll

The vibroscope.— This is essentially a stroboscope, and consists of a contact breaker, an induction coil and a portable lamp holder in which are mounted three high-intensity neon discharge tubes. The contact breaker is temporarily fitted to the machine in such a manner that it is driven through a flexible coupling at shaft speed. While the machine is running, the housing of the contact breaker can be moved by hand through 360°, carrying the contact with it. Thus, the break may be caused to take place at any point of the shaft revolution, at the will of the operator. The primary circuit of the induction coil is completed through the contact, and the neon tube in the portable holder, together with the small neon tube in the vibrometer, are connected in the secondary circuit of the coil. The neon tubes will all "flash" once each shaft revolution, and at that point in the revolution determined by the operator when he turns the contact breaker.

Operation.—It is necessary first to mark the circumference of the shaft (or some other part rotating at shaft speed) at a position where the marking is visible to the operator, with six to twelve equally spaced lines which should be clearly numbered. *(See Figure 4).* The contact breaker is now fitted, and the vibrometer set up on a base rigidly fixed to that part of the machine at which the vibration is to be checked. Now, with the machine running at full speed, the figure traced on the screen of the vibrometer represents the amplitude and character of the vibration present at the point under investigation. If, from the shape of the figure, it is evident that some mechanical trouble other than unbalance is present, it is useless to proceed further until such trouble is rectified. However, assuming that pure unbalance is indicated, we have now an accurate measure of the horizontal and vertical components of the vibration.

The vibroscope can now be brought into operation, and the momentary synchronous flashing of the neon tube in the vibrometer produces a red spot of light somewhere on the outline of the figure on the ground glass screen. This spot can be caused to traverse the figure outline by moving the contact breaker housing round by hand,

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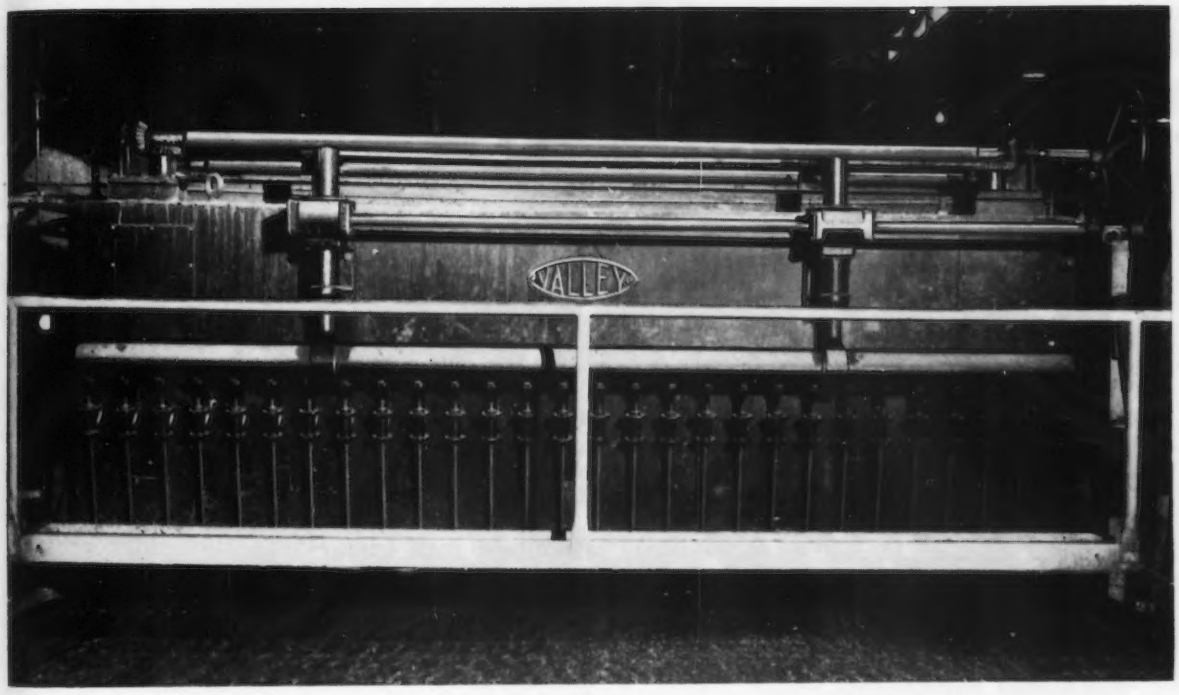

AGAIN...it's Inlet and Headbox

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On MORE and MORE paper machines it's INLET and HEADBOX by **VALLEY**

VALLEY IRON WORKS CO.
Appleton, Wisconsin

and when it reaches a point at one extremity either at the top or to the side of the figure, it indicates that the contact breaker is operating at the instant of maximum deflection in that particular direction. If the part of the machine previously marked with numbered lines now be viewed in the position indicated by the red light spot, (that is, either at the top or to the side) under the light from the neon tubes in the portable holder, the exact position of the "high spot" can be read directly from these marks.

Having measured the amplitude of vibration and determined the location of the "high spot," the heavy spot has to be located and eliminated as nearly as possible by the addition of weight 180° from it. In a machine which it is possible to run in both directions, the "heavy spot" is easily found by taking "high spot" readings in both directions. The "heavy spot" will lie equidistant between the two readings. The location of the "heavy spot" on machines which cannot be reversed may be arrived at, by an experienced operator, after a few test runs. By attaching a test weight at a point which, from his experience, he estimates as approximately correct, and taking a further set of vibrograms and "high spot" readings, the change in the vibration amplitude, whether improved or otherwise, gives valuable data for the next run. The estimated angle of lag also will be checked on this first test, as error in this respect will be reflected as a change in the location of the "high spot." This can be corrected on following runs. Movement of the "high spot" forward in the direction of rotation indicates under-estimation of the lag angle, and if the movement is back against the direction of rotation, over-estimation of the angle of lag is indicated.

BALANCING THE BREAST ROLL

History

This breast roll from No. 1 paper machine, Burnie mill of Associated Pulp and Paper Mills Limited, was sent to Melbourne with the primary object of having the surface re-rubbered. The old rubber was stripped and the roll surface prepared for the new rubber when a report from Burnie indicated that for some time trouble had been experienced with vibration and irregular running of the fourdrinier wire. It was therefore suggested that the dynamic balance be checked, and if necessary corrected before returning the roll to Tasmania. As the roll had been dynamically balanced at the manufacturers' works before going into service, and the vibrations had developed since that time, it was reasonable to assume that some incident had occurred to disturb its original condition.

The process of re-rubbering was therefore deferred in order to investigate the mechanical condition of the roll.

Figure 9.—Exaggerated view of roll eccentricity

Preliminary Investigation

General particulars of the roll are as follows:—

Diameter	24 in. (over rubber)
Length	200 in. (nominal)
Operating speed	700-900 rev./min.
Weight	1½ tons (approx.)

The mechanical details of construction are shown in *Figure 8.*

A heavy spider is riveted inside each end of the cylinder, and bolted to these spiders are the stub shafts. Moisture is excluded from the interior of the roll by bronze covers tightly fitted to the shafts, and in the original assembly brazed to the ends of the cylinder. Self-aligning roller bearings fitted to the shaft on withdrawal sleeves are held in position by further bronze sleeves which are themselves secured by set-screws into the shaft end.

In order to inspect the spiders and to check all securing bolts for tightness, it was necessary to machine off the bronze end covers. All bolts and nuts were found to be tight, and the original balance weights were securely attached to the spider where a circle of tapped holes is provided for this purpose. The roll was then set up and checked for alignment by means of clock gauges. The result of this check disclosed that both shafts were bent in approximately the same direction.

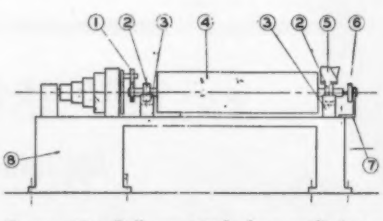

Figure 10.—Roll mounted for preliminary balance check

Corrective Procedure

Various methods of correction were considered and the course finally adopted was carried out by Vickers Ruwolt Pty. Ltd. in the following manner:—

(i) The roll was set up in a lathe, true with centerlines of existing bearing journals whch were 5.5118 in. diameter

(ii) The journals were skimmed up to be parallel and true, removing the minimum of metal to achieve this, and finishing with both journals of the same diameter, viz., 5.507 in.

(iii) New withdrawal sleeves, modified to suit the new diameter of journals, were provided

(iv) Shoulder adjacent to journal was skimmed up true removing as little metal as possible

(v) Portion of each stub shaft normally covered by bronze sleeve was skimmed true

(vi) Section of each stub shaft to which bronze covers are fitted was machined to 7.500 in.

(vii) Each end of roll and spider was bored out and faced to take new end covers; covers were left off until after roll was balanced.

Figure 8 also illustrates the above procedure, from which it will be obvious that although the journals were now in true alignment, the roll shell was slightly eccentric.

Subsequent re-rubbering and grinding, of course, made the roll surface and the journals once more concentric,

but still left an unbalanced mass of metal to be corrected by the addition of weights. An exaggerated view of this condition is shown in *Figure 9*.

Preliminary Balance Check

After truing the shaft as outlined above, and before applying the new rubber, a preliminary check on the state of balance was deemed advisable. It was decided also to correct the unbalance present at this stage to a condition where only final adjustment of weight due to the effect of the added rubber was necessary. We were then faced with a situation where, although we were provided with equipment ideal for balancing *in situ*, it was necessary to devise a method of mounting and driving the roll which would imitate operating conditions as closely as possible. This difficulty was overcome in the manner shown in *Figure 10*.

A lathe was made available at the works of Dunlop Rubber Australia Ltd. and the roller bearings were obtained from Burnie. Vee-blocks suitably packed supported the bearing races and a U-clamp was improvised to hold them in position. The drive was arranged through the lathe head-stock, face-plate and pin engaging with a specially constructed carrier, which was clamped to one stub shaft. To avoid the transmission of shocks from this driving arrangement to the roll, a strip of sponge rubber 1 in. thick was interposed between the clamp and the stub shaft. Pulleys proportioned to give speeds from 120 rev./min. upwards in either direction of rotation were arranged, and provision was made for mounting the vibrometer on the top of each bearing, and for driving the contact breaker from the free end of the roll shaft. The lower speed of 120 rev./min. proved unsatisfactory as it was difficult to read "high spot" numbers with the slow rate of flash obtained. Speed was therefore increased to approximately 260 rev./min. and balancing was continued satisfactorily at this speed. Vibration amplitude, due to initial unbalance, was found to be 0.0105 in. and the vibrogram illustrating these heavy horizontal deflections is reproduced in *Figure 11*.

Weights of suitable size and shape for attachment to the roll were provided, and in order to vary easily the

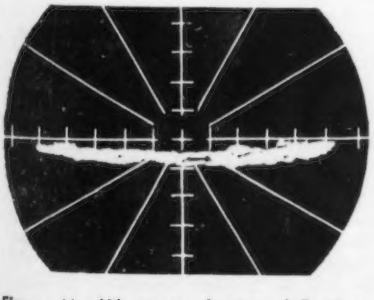

Figure 11.—Vibrogram showing deflections due to initial unbalance. 1 Division=0.001 in.

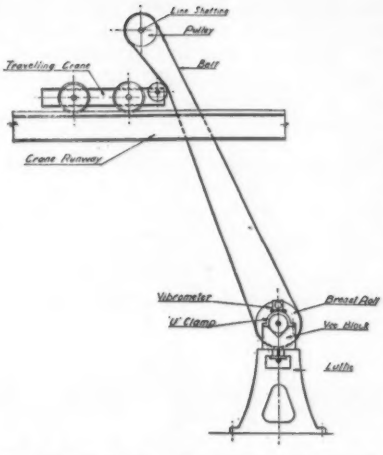

Figure 12.—Final arrangement for driving roll

amount of correction applied, they were made from boiler plate varying in thickness from 0.25 in. to 1.0 in. "High spot" readings were taken in each direction of rotation and suitable weights applied. Due to lack of space, the difficulty at this stage was the inability to concentrate weight just where it was necessary. By spreading weight over a longer arc than that covered by one pair of balancing holes, and increasing the length of holding studs, better results were obtained but it was finally necessary to make use of cast lead weights as a temporary measure. By these means, the vibration amplitude was reduced to 0.002 in. at 120 rev./min. and the roll was in a "weight-sensitive" condition where comparatively small weight changes produced marked alteration in the size of the Lissajous figure.

The general condition of balance was now such that re-rubbering could proceed; and it is interesting to note the amount and distribution of weight necessary to obtain this result. With the roll divided into twelve sections of 30° each, approximately 24 lb. was added between 12 o'clock and 1 o'clock at one end, while at the other end 23 lb. was attached in the same relative position. At this end it was also necessary to add 6 lb. between 10 o'clock and 11 o'clock.

Final Balance

The roll now having been re-rubbered and the surface ground true with the journals, it was ready for final adjustment. On setting up in the same manner as previously, and with weights unchanged, trouble was experienced in obtaining "high spot" readings due to varying shape and amplitude of the Lissajous figure. This was finally traced to slipping of the driving clamp on the stub shaft and transmission of external vibrations from the lathe head-stock. In the initial stages of balancing, this trouble, although present, was not of much consequence as the interference was small in comparison with the unbalance. Now, however, when nearing a state of balance, external vibration could no longer be tolerated. To eliminate interference from these sources and to ensure a positive drive, the original arrangement was discarded and the method shown in *Figure 12* adopted. This left only the interference coming from the line shafting through the building structure and lathe foundations; and in order to reduce this to a minimum value all further work was carried out at week-ends.

The roll was set in motion by hand, with the belt running slack, this slack being gradually taken up by moving the overhead crane in such a way as to act as an idler pulley until finally the roll was being driven directly from the line shafting at approximately 260 rev./min. Balancing was continued satisfactorily under these conditions, and at this speed, until deflections were reduced to a maximum of 0.0015 in.

In order to obtain measurements of deflections within the normal operating speed range, the belt was slackened and the roll allowed to coast to rest. The interpretations of the vibrograms obtained in this manner are tabulated (*see Table I.*) At the critical speed

TABLE I
INTERPRETATIONS OF VIBROGRAMS

Speed		Amplitude of Vibration	
		End "A"	End "B"
rev./min.	ft./min.	in.	in.
260	1634	0.0015	0.0015
200	1256	0.0010	0.0010
150	942	0.00075	.....
130	817	.....	0.0010
120	755	0.0010	0.00050
90	565	.....	0.00070

which occurred just under 100 rev./min. deflections increased to 0.0030 in. at one end and 0.0025 in. at the other. These deflections are all well within permissible limits. It was then necessary to replace each group of temporary test weights with a consolidated

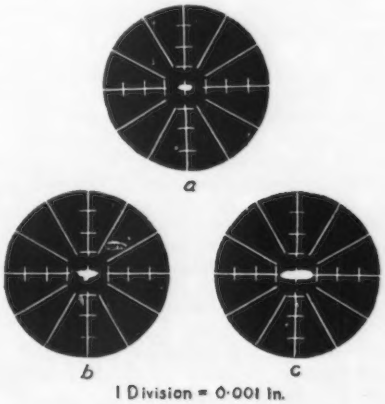

Figure 13.—Vibrograms showing deflections due to residual unbalance. (a) Outside interference only (roll stationary). (b) Residual unbalance plus interference (a) at one end of roll, (c) Residual unbalance plus interference (a) at opposite end.

mass permanently fixed in position. Theoretically the resultant mass required should be found by adding the individual weights vectorially; but, in this instance, as the weights were overlapping and altogether did not cover a wide angle, it was considered sufficiently accurate to add them arithmetically.

This work was carefully carried out by Vickers Ruwolt Pty. Ltd. One solid weight of mass equal to that of the group it was to replace, was manufactured and fitted to the roll in a position where the center of gravity of the test weight group and the new weight coincided. A final check of the roll balance was then made, and the vibrograms of bearing deflections obtained are reproduced in *Figure 13.*

From these diagrams it will be seen that outside interference gave rise to at least 0.0006 in. of the total deflections of 0.001 in. and 0.0016 in. occurring at the respective bearings. Making due allowance for this interference it may be said that deflections due to residual unbalance were no greater than 0.001 in. at either end.

The permanent weights were then tack-welded in position and the new bronze end covers finally fitted to the roll.

ACKNOWLEDGMENTS

The author wishes to express his thanks and appreciation to Mr. C. G. H. McDonald, Acting Chief Electrical Engineer, Victorian Railways; and also to Associated Pulp & Paper Mills Ltd., for permission to publish this paper.

Reproductions showing mechanical details of breast roll are extracted by permission of Vickers Ruwolt Pty. Ltd., from their drawing, details for which were supplied by Walmsleys (Bury) Ltd.

New Paperboard Machine at Karton-und Papenfabrik Mayr-Melnhof & Co., Frohnleiten, Styria, Austria, November 14, 1951

Excerpts from remarks by

Dr. Joseph E. Atchison
Chief, Pulp and Paper Branch
ECA, Washington, D. C.

On behalf of the Economic Cooperation Administration of the United States of America I should like to tell you that we are pleased to have played a part in development of this excellent project. We have great faith in its immediate success. It is our sincere feeling that the entire pulp and paper industry of Austria has an opportunity to achieve a future success far greater than you have dreamed of in the past.

I know that all of you who are connected with this industry will play an important part in this future, and I know that you all share my optimism about it.

As I drive over the beautiful Austrian countryside, I see huge forests and sparkling, fast moving streams which furnish the raw material and the power for your industry. As I visit the various mills, I see unmistakable evidence that many highly skilled workers are available to convert these raw materials into finished products, if they are given the tools. Then it remains for the managers and the technical experts to provide the tools for this manpower so that they can produce from these raw materials the greatest amount of products, the highest quality products and at the lowest possible cost.

If this is done, and I believe that it is being done here, then the Austrian pulp and paper industry can stand on its own in competition with any country in the world.

As I have visited the various mills in Upper Austria, in Carinthia and now in Styria, I am impressed with the tremendous amount of progress which has been made since I was here sixteen months ago. The large industry-wide investment program which is now under way is an important step in the right direction. I am proud that the Marshall-Plan is playing a major part in financing this program.

This mill is an example of what can be done and what is being done by cooperation of Austrian industry, the Austrian Government and the Marshall-Plan. I must point out, however, that this is only a beginning. Much more will have to be done year after year by private financing, if Austria is to maintain its rightful position in the pulp and paper markets of the world. No paper mill can remain static and survive. It must progress or perish. I have faith that the Austrian mills will continue to progress.

The ECA is doing everything possible to assist the pulp and paper industry of Austria in its program of modernization and rationalization. We are doing this by giving financial assistance to the maximum extent and by furnishing technical assistance where it is needed. Again, however, I should like to emphasize that we merely give *assistance* and make no attempt to do the whole job. The really important part of this job is up to all of you, to you who cut the wood in the forest, to you who haul it to the mills, to you who keep the machines running day after day, and to you managers and technical men who are responsible for the planning and the direction of the overall operations.

Completion of such projects as this are possible only through the wholehearted cooperation of all of you working together as a well coordinated team.

At the present time, Western Europe is faced with a serious shortage of pulp, paper and paperboard, and the raw materials to produce these vital commodities. Austria is one of the few countries in Europe which has adequate forest resources to supply the pulpwood necessary to support a large industry. As a result, many other countries are looking toward Austria for large quantities of future supplies.

A rapid expansion in the use of paperboard packaging is now underway all over the world. This expansion can continue only if mills such as this one can turn out large quantities of high quality board at reasonable prices. I am certain that Mayr-Melnhof will play an ever increasing role in supporting this expansion.

You have the raw material, you have the power, you have the skilled manpower and you have the leadership. By your continued cooperation, you should go forward rapidly, always striving for increased efficiency, greater productivity per man, and improvement in the quality of your products. With such progressive efforts you are certain to become one of the leaders in the European paperboard packaging industry.

We in the ECA salute you in these efforts and wish you the best towards even greater success.

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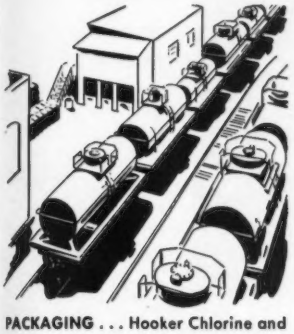

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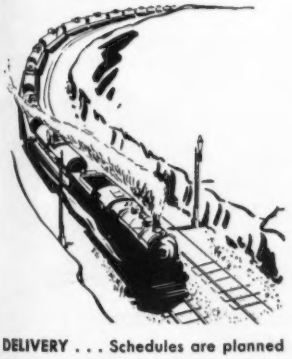

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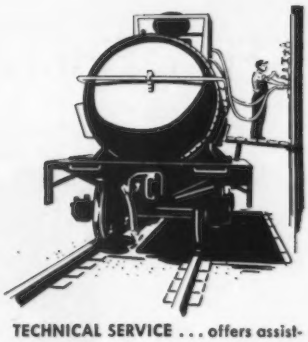

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First Finnish Chemi-pulper Now Operating

Left to right—Junno Laanti, Assistant Chief Chemist; Matti Rautakorpi, Planning Engineer; Heikki Sihtola, Mill Manager; R. G. Goodwin, Paper & Industrial Appliances, Inc., and Seppo M. Saukkonen, Chief Chemist and Semi-chemical Pulp Mill Superintendent.

The Chemi-Pulper unit at Veitsiluoto, Finland, was installed and started up this summer to operate primarily on waste spruce and pine which is available from the Veitsiluoto sawmill operation.

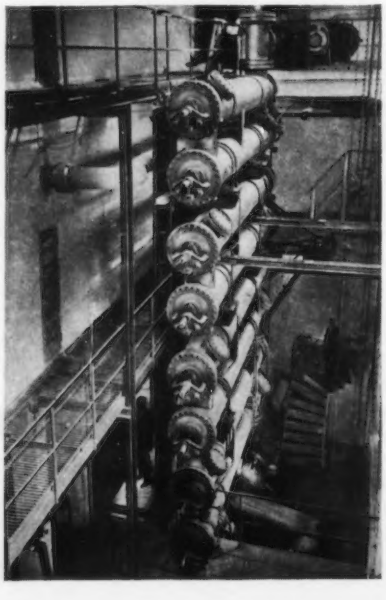
Paper and Industrial Appliances, Inc. supplied the continuous digester, which operates with an Asplund Defibrator, as well as some of the auxiliary equipment for this pulp mill. R. G. Goodwin, Director Sales Engineering for the New York firm, who has recently returned from an extended European trip, was present for the start-up of the first Finnish Chemi-pulper installation.

The first picture shows the key personnel at the Veitsiluoto plant standing near the base of the new unit.

The complete Chemi-pulper installation, including the Asplund Defibrator which is located in a pit, is clearly shown in the second picture.

The general flow at the Veitsiluoto operation calls for continuously feeding the screened pine or spruce chips to the 8-tube Chemi-pulper, and equipment is available to pre-soak the chips if required. The hot stock coming from the unit is refined in a Sprout-Waldron Refiner. The pulp passes onto the hot stock chest and is pumped directly to a stainless steel vacuum washer which is equipped with a repulper. The pulp may go directly to a Kamyr wet machine from the washer or it can pass over a screen and thickener and then to the wet machine.

Most of the equipment in the Veitsiluoto continuous pulp mill is made from 316 stainless steel; therefore, they are in a position to use either acid or alkaline cooking liquors. The pulp from this operation is produced for sale; therefore, the installation will be operated in a manner that will produce the desired quality of pulp to meet the customers' requirements. This continuous digester has the ideal flexibility required by this operation and will generally be used to produce pulps in the 50 percent to 75 percent yield range, using either acid or alkaline cooking liquors.



To Demonstrate Automatic Tension Control

John Furey, Monkley Corp., Worcester, Mass., is to demonstrate an automatic tension control unit at the February 1 dinner meeting of the Connecticut Valley Division of The American Pulp and Paper Mill Superintendents Assn.

This demonstration will supplement the feature address of the meeting which is to be given by Dr. Allen A. Stockdale of the National Assn. of Manufacturers.

The meeting is scheduled for 7:00 p.m. at the Roger Smith Hotel, Holyoke, Mass.

Alfred Montagna of the Southworth Co., West Springfield, Mass., is chairman of the Connecticut Valley Division.

Camachine Type 18 is one of the four great Camachine mill-type winders. The Type 18 is dynamically balanced to the maximum speed of 2500 fpm. The Type 18 may be built to your choice of 42", 60" or 72" maximum rewind diameter, for trim widths ranging from 73" to 150". The Type 18 may be equipped for score-cut slitting, using air-operated slitter units, or for shear-cut slitting.

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The four great mill-type Camachines (Types 14, 18, 19 and 20) offer a choice of maximum speeds ranging from 1800 fpm on Type 14 to 5000 fpm on Type 20, depending upon characteristics of the material, number of cuts, web tension and machine width.

Consider the ECONOMY

Four great, job-proved mill winders offer you a choice of the model best suited for low-cost, dependable performance in your plant. That's one good reason why more than 400 paper and paperboard mills in the United States have chosen Camachines.

Consider the VERSATILITY

Rolls produced on Camachines include over 80 different product classifications of paper and paperboard, from newsprint to roofing paper, in trim widths ranging from 53" to 310".

Consider the ROLL QUALITY

Automatic counterweighting, sensitive tension controls, built-in alignment, and dynamic balance are among the many features which assure clean-cut uniformly wound, top-quality rolls in all mill type Camachines.

Consider the FACTS and you'll wind up with Camachines®

CAMERON MACHINE COMPANY
61 Poplar Street, Brooklyn 2, New York

PRICES

The prices below reflect market quotations in New York at the mill level on standard grades. Does not include spot offerings.

PAPER AND BOARD

Standard News, Delivered Ports

Rolls, contract, per ton	$114.00/116.00
Sheets	130.00/ —

Kraft— per cwt. 50# base wgt. OPS Ceiling CPR 88

F.o.b. Southern & Western integrated mills. C.l. Freight allowed up to $10 a ton.

Standard Wrapping, ctr. rolls	$7.75/ —
Butchers, counter rolls	8.25/ —
Standard Bag, mill rolls	7.50/ —
Shipping Sack, mill rolls	7.75/ —
Gumming, mill rolls	8.00/ —
Asphalting, mill rolls	7.75/ —
Envelope, Sub. 20, mill rolls	9.25/ —

Tissues— per ream 24x36 (480) 10 lbs. 2500 lbs or more

Wh. No. 1 Frd.	$2.25 /$2.40
Wh. No. 1 MG	2.25 / 2.40
Wh. No. 1½	1.95 / 2.05
Wh. No. 2	1.75 / 2.00
Kraft Anti-Tar 20x30	2.12 / 2.25
White Anti-Tar 20x30	2.20 / —

Toilet— per case of 100 rolls—1M sheets

Unbleached 4½x4½	$8.00/$8.25
Unbleached 4½x5, 650 sheets	6.65/ —
Bleached 4½x4½	10.00/12.50
Bleached 4½x5	9.96/ —
Per Case of 50 rolls—2000 sheets	
Unbleached 4½x4½	$8.00/$9.75
Bleached 4½x4½	6.95/ —
Per Case of 100 rolls—1000 sheets	
Facial, 4½x4½, 2-ply	$8.95/10.37
4½x5, 2-ply	10.25/10.75

Paper Towels— per case of 3750

Wh. Jr. M'tif'd 9½x9½	$6.40
Br. Sr. M'tif'd 9⅞x12	4.40
Br. Jr. M'tif'd 9½x9⅞	3.90
Br. Jr. Sgl. fold 9⅞x10¾	3.95
C-Fold 10¼ min. x 14 max.	$5.90/$6.64
Blchd. 7½x11, 48/50 rolls	$6.80/$7.92

Manila, per cwt.

No. 1 Jute Tag, 100-lb., sheets	$20.55/22.55
Reg. Jute M.F. 40-lb., sheets	19.50/21.50
Printing Manila	10.50/12.00

Gummed Tape— per bdl., 500 bdls. or more

90-lb. 375 ft. GSI	$7.20 / —
60-lb. 600 ft. GSI	7.20 / —
35-lb. 800 ft. GSI	8.28 / —
35-lb. 500 ft. GSO	6.21 / —

MARKET WOOD PULP

First Quarter Contract Prices. Per Short Air-Dry Ton

	Varying freight allowances		On Dock Atlantic Ports		
	*U. S.	Canadian	*Swedish	*Finnish	*Norwegian
Groundwood	$92.50/ —	‡$95.00/100.00			
Sulfate, Bleached	145.90/ —	190.00/200.00	$230.00/ —	$230.00/ —	$230.00/ —
Semi-bleached Sulfate	140.00/ —				
Sulfate, Unbl.	132.50/ —	145.00/175.00	200.00/ —	200.00/ —	
Sulfite, Blchd.	140.00/ —	160.00/175.00	225.00/ —	225.00/ —	225.00/ —
Sulfite, Unblchd.	132.50/ —	150.00/160.00	200.00/ —	200.00/ —	
Sulfite, Unbl'd (Glassine)		164.00/ —			
Soda, Blchd.	140.00/ —	155.00/160.00			
Sulfite Screenings	72.50/ —				
Sulfate Screenings	67.50/ —				
Groundwod Screenings	60.00/ —				
Unblchd Sulfate Sideruns	132.50/ —				
Stand. News. Sideruns	92.50/ —	106.00 —			

* OPS Ceiling, CPR 49 ‡ F.o.b. Shipping Point.

Boards Delivered plant, per ton ..... CPR 108

Filled News	$110.00/ —
Plain Chip	105.00/ —
Blchd. Mla. L-d. Chip	150.00/ —
White Pat. coated .020	175.00/ —
Kraft Liners 42 lb. per M sq. ft.	2.47/ —
Kraft Corr. .009 per M sq. ft.	1.59/ —
Binders Boards	137.50/140.00

The following prices are representative distributors' resale prices:

Rag Content Bonds and Ledgers—
White, 20 lb.

Bonds	4 Ctns.
	per cwt.
100% Rag Ex. No. 1	$70.45/$75.90
100% Rag	62.65/ —
75% Rag	48.15/ —
50% Rag	38.90/ —
25% Rag	31.65/ 33.00

Ledgers	4 Ctns.
	per cwt.
100% Rag Ex. No. 1	$72.65/$72.80
100% Rag	63.90/ —
75% Rag	49.40/ —
50% Rag	40.20/ —
25% Rag	33.00/ 34.30

Sulphite Bonds and Ledgers
White, 20 lb.

Bonds	4 Ctns.
	per cwt.
Watermarked	$19.00/$20.50
Plain	18.40/ 19.50

Ledgers	4 Ctns.
	per cwt.
Watermarked	$20.30/$21.80
Plain	19.35/ 20.80

White Book

Conversion Coated	Case
	per cwt.
No. 1	$23.90/$24.65
No. 2	22.15/ 23.40
No. 3	21.90/ 22.40
Machine Coated	
No. 1	$18.40/$18.90
No. 2	16.65/ 16.90
Uncoated	
No. 1 Antique (Watermarked)	$18.65/$19.65
Offset	18.65/ 19.90
A Grade E. F.	18.10/ 19.90
A Grade S. C.	18.65/ 19.40
B Grade E. F.	18.40/ —
B Grade S. C.	17.40/ 19.15

‡ Indicates a price change.

WASTE PAPER MARKET

Prices to mills, per ton, f.o.b. cars shipping point (includes brokers' fee.) These quotations are a partial indication of the price range in each market on the date specified, as gathered from major dealers. ALL PRICES ARE STRICTLY NOMINAL.

	New York Jan. 7	Philadelphia Jan. 7	Boston Jan. 5	Chicago Jan. 7
No. 1 Mixed Paper	nominal	nominal	$10.00/ —	$10.00/ 13.00
No. 1 News	12.00/ 14.00	11.00/ —	12.00/ 13.00	17.00/ —
Over-issue News	15.00/ 18.00	12.00/ 14.00	15.00/ 22.00	20.00/ —
Mill Wrappers (Sulfite)	13.00/ 22.00	10.00/ —	12.00/ —	13.00/ —
Corrugated Containers	15.00/ —	12.00/ 14.00	15.00/ 15.50	17.00/ —
Double Kraft Ld. Corr. Cuts	35.00/ 63.00	35.00/ 50.00	40.00/ 63.00	55.00/ 63.00
100% Kraft Corr. Cuts	60.00/ 80.00	75.00/ 80.00	75.00/ 80.00	85.00/ —
Used Sugar & Flour Bags	45.00/ 50.00	35.00/ 50.00	45.00/ 46.50	50.00/ —
Super Resorted Br. Kraft	60.00/ 70.00	45.00/ 55.00	45.00/ 60.00	50.00/ —
New Br. Kraft Env. Cuts	115.00/125.00	100.00/ —	100.00/125.00	100.00/ —
New Br. Kraft Cuts	105.00/115.00	95.00/ —	85.00/105.00	90.00/ —
No. 1 Gdwd Shvs.	35.00/ 45.00	30.00/ 40.00	33.00/ 40.00	32.00/ —
White Newsblanks	60.00/ 70.00	60.00/ 70.00	55.00/ 75.00	50.00/ —
No. 1 Flyleaf Shvs.	35.00/ 60.00	45.00/ 50.00	45.00/ 70.00	60.00/ —
No. 1 Soft Wht. Shvs.	125.00/140.00	110.00/ —	125.00/145.00	125.00/ —
Super Soft Wht. Shvs.	160.00/165.00	— / —	140.00/165.00	135.00/ —
Hd. Wht. Shvs.	160.00/170.00	145.00/155.00	150.00/175.00	140.00/ —
Hd. Wht. Env. Cuts	165.00/175.00	170.00/175.00	175.00/190.00	150.00/ —
New Manila Env. Cuts	100.00/120.00	95.00/110.00	110.00/125.00	65.00/ —
Col. Tab Cards	80.00/ 85.00	70.00/ 75.00	80.00/ 95.00	75.00/ —
Manila Tab Cards	110.00/120.00	100.00/110.00	120.00/130.00	100.00/ —
No. 1 Mixed Ledger	75.00/ 80.00	70.00/ 75.00	67.00/ 95.00	80.00/ —
White Ledger	100.00/105.00	95.00/105.00	100.00/110.00	95.00/ —
No. 1 Book & Mag.†	33.00/ 37.00	22.00/ 24.00	29.00/ 32.00	27.00/ —
No. 1 Rep'd. Hvy. Books‡	43.00/ 50.00	30.00/ 32.00	45.00/ 57.00	40.00/ —

† Includes Time & Life; no coarse groundwood. ‡ Not to exceed 10% groundwood. § Deld.

RAG MARKET

New Domestic Cotton Cuttings
OPS Ceiling Price, CPR 28
Delivered Mill Basis

Add 7½% Dealer Commission

No. 1 White Shirts	$21.00
No. 1 Unblchd. Muslins	21.00
Blchd. & Unblchd. Underwears	21.00
Blchd. Canton Flannels	21.00
No. 1 Light Silesias	16.00
No. 1 Light Prints	11.50
No. 1 Blue Overalls	14.50
Suntan Khakis	11.50

Add 10% Dealer Commission

Fancy Shirts	$10.00
Indigo Blues	10.00
Mixed Khakis	8.00
Corduroys	8.00
Cottonades	8.00
No. 1 Washables	6.50

Old Domestic Cotton Rags
(Prices to Dealers, F.o.b. Ship. Pt.)

	Per 100 lbs.
Mixed White	$6.00/$6.50
Cotton Pants & Overalls	6.50/ 6.75
Thirds and Blues, Repacked	5.00/ 5.50
No. 1 Roofing Rags	1.20/ 1.25
No. 2 Roofing Rags	1.00/ 1.10
No. 3 & 4 Roofing Rags	.90/ 1.00

Bagging
(Prices to Dealers, f.o.b. N. Y.)
PRICES NOMINAL

	Per 100 lbs.
Foreign Gunny	$5.50/$6.75
Domestic Gunny, No. 1	5.50/ 6.25
Heavy Wool Tares	5.50/ 6.00
Foreign Manila Rope	9.00/ 9.25
Domestic Manila Rope	9.00/ 9.25
Jute Strings	6.00/ 6.50
No. 1 Sisal Strings	8.50/ 8.75
Paper Mill Tares	5.25/ 5.50
Foreign Scrap Burlap	4.75/ 5.25
Domestic Scrap Burlap	5.50/ 6.00
Austr. Wool Pouches	7.50/ 8.00
New Burlap Cuttings	7.00/ 7.50

All Langston Slitters and Winders are equipped with efficient and modern shear cut slitters which insure absolutely clean cut, dust free, uniform slitting.

Set-up is quickly and easily made—the front frictionally driven slitters can be instantly disengaged for thread-up, as shown below.

The front slitter angle is fixed and tamper-proof—a simple adjustment is provided to compensate for reduced slitter diameter as a result of grinding.

The best shear cut slitters available are only one of several Langston exclusive features — better check with Langston first!

SAMUEL M. LANGSTON COMPANY

CAMDEN • NEW JERSEY

MATERIAL PRICES

Aluminum sulfate:		
coml. bags, wks.....cwt.	1.65	
iron-free, c.l.	3.25	
Alcohol, ethyl:		
tax free, dms. c.l.....gal.	1.01	/ 1.05½
deld. East Miss.		
Alcohol, methyl:		
Synthetic, Zone 1, dms.		
c.l. fit. alld.....gal.	.44	
Casein, acid prec.:		
dom. sh. pt. c.l. .....lb.	.33	/ .41½
imp. ex. dock .....lb.	.21	/ .36
Caustic soda:		
c.l. wks. solid, 76% cwt.....	3.35	
flak. & grd. 100-lb. drums...	3.75	
liquid 50% tanks....	2.55	
liquid 70% tanks....	2.65	
China clay:		
dom. air-float. c.l. wks.		
ton	10.00	
water-washed, lump, filler....	11.00	
coating	17.60	/30.50
imported, ex whse...short ton	15.20	/28.35
Chlorine:		
single-unit tanks, works..cwt.	2.70	
multi-unit .....cwt.	3.20	/ 4.40
Formaldehyde:		
USP, inh. dms, c.l. wks....lb.	.0625/	.0675
l.c.l., E. wks.....	.0675/	.0725
Fuel oil:		
Bunker C, No. 6 Cal. hvy.		
tanks, refinery .....bbl.	1.95	/ 2.15
light .....bbl.	2.00	/ 2.25
Hydrogen peroxide:		
USP, 35% cbys. E. of Miss. lb.	.23½/	.26½
Lime:		
hydrated, bags, wks. .....tons	13.50	
Rosin:		
B gum, drms, c.l. Savan..cwt.	7.00	/ 9.08*
G, H, I, K .....cwt.	8.10	/ 9.49*
FF, wood, do.....cwt.	6.80	/ 7.30*
* OPS Ceiling, CPR 52.		
Rosin size:		
70%, gum & pale grds, tank		
cars, south, sh. pt. ....cwt.	7.50	/ 7.60
Salt cake:		
dom. bulk, c.l. wks.....ton	17.00	
wks. frt. all.....ton	20.00	/22.00
Soda ash:		
light, 58%, bags, wks.....	1.50	
bulk .....cwt.	1.20	
Sodium silicate, 40°:		
turbid. c.l. wks.....cwt.	1.30	/
l.c.l. wks.	1.60	/ 1.85
Sodium peroxide:		
dms. c.l. E. of Miss.....lb.	.21	
l.c.l. do. .....lb.	.21½/	.22
Soybean, protein:		
chem. isol, wks, c.l.....lb.	.24	/ .28
Cinn. and Chic.		
Sulfuric acid:		
60° Be. cbys. c.l. wks.....cwt.	1.75	/ —
l.c.l. wks. .....cwt.	2.05	/ 2.85
Sulfur:		
crude, c.l. mines, contract,		
long ton	21.00	/22.00
f.o.b. vessels Gulf	22.50	/23.50
Sulfur dioxide:		
liquid, coml. cyl. wks.....lb.	.09	
multi-unit cars .....lb.	.0535	
Starches:		
pearl corn, bags, c.l. wks..cwt.	6.34	/ —
white dextrines, c.l. wks...cwt.	7.73	/ —
potato, Idaho, c.l. wks....cwt.	6.50	/ —
potato, Maine, c.l. wks....cwt.	nominal	
tapioca, conv. dextrines...cwt.	6.75	/ 8.00
Talc:		
domestic, 50-lb. sacks, c.l.		
wks. .....ton	25.00	/30.00
Titanium dioxide:		
anastase, c.l. deld., bags...lb.	.21	/ .21½
l.c.l. deld. .....lb.	.22	/ .22½
rutile, c.l. deld.....lb.	.23	/ .23½
l.c.l. deld. .....lb.	.24	/ .24½

Reduce Kraft Mill Odors

(Continued from page 14)

provide strong indications that a very effective system of odor reduction can be centered in a black liquor fixation unit of the type under development by the British Columbia Research Council. Such a system would have all the other advantages deriving from black liquor oxidation. The design of a full scale unit is now in hand.

This work was undertaken as a project jointly sponsored by the British Columbia Research Council and the following firms: Brown Corporation Ltd., Consolidated Paper Corporation Ltd., Dryden Paper Co. Ltd., Fraser Co. Ltd., H. R. MacMillan Export Ltd., Bloedel, Stewart and Welch Ltd., (now MacMillan & Bloedel).

NEW LITERATURE

Birmingham Chamber of Commerce, Committee of 100, Birmingham, Ala. Brochure, "Birmingham Crossroads of the South." Summarizes transportation and distribution data about Birmingham . . . Book, "The Spirit of Birmingham." Gives facts concerning Birmingham's population growth, culture, hotels, schools and general information.

Minneapolis-Honeywell Regulator Co., Brown Instruments Div., Wayne and Windrim Aves., Philadelphia 44, Pa. Catalog No. 9300, "Radiamatic Pyrometers Compensated Radiation Detectors." Includes sections on operation, theory, constructional features, engineering specifications, accessories, and typical applications supplemented with photographs and line drawings. . . . Instrumentation Data Sheet No. 10.15-3a, "Indicating and Recording Flue Gas Analyzer. An Accurate Guide to Efficient and Economical Combustion." With the aid of photographic illustrations and schematic diagrams, describes the equipment, how used for combustion control analysis, its operation and construction.

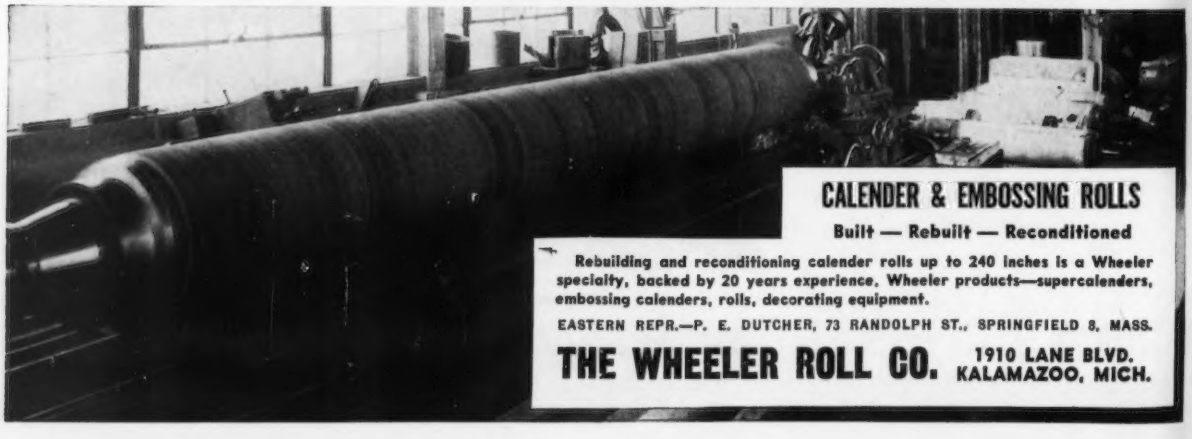
Monsanto Chemical Co., Merrimac Div., Everett Station, Boston 49, Mass. Booklet, "Mersize RM." Features new paper sizing, Mersize RM. Sales copy.

Oakite Products, Inc., 22 Thames St., New York 6, N. Y. Booklet, "Oakite News Service." Featuring: "Five Ways to Keep Your Cleaning Costs Down," and "Scale an Industrial Bugaboo."

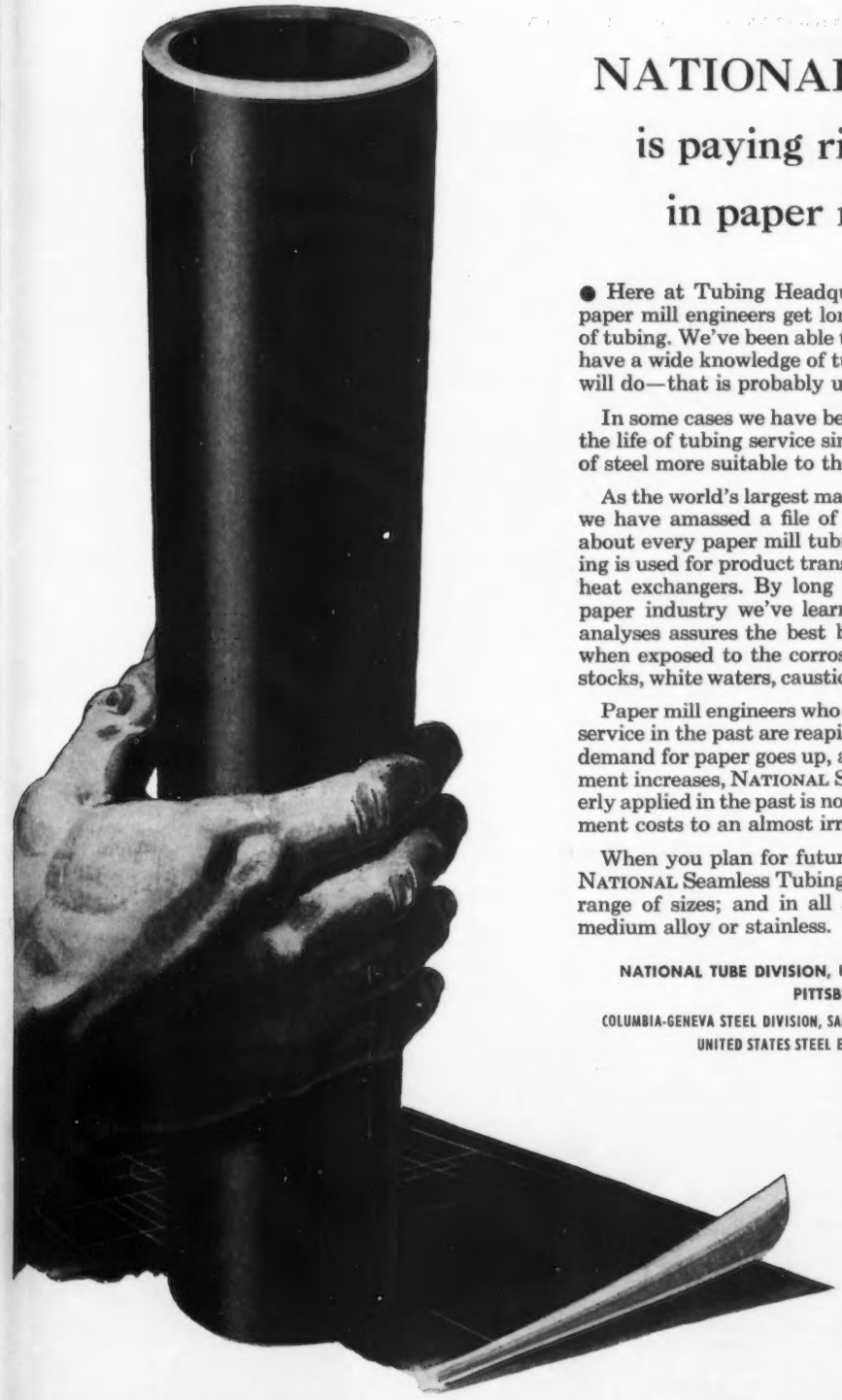
Research and Engineering Council of the Graphic Arts Industry, Inc., 719 Fifteenth St., N.W., Washington, D. C. Book, "Static Electricity in Paper Handling." Discusses problems involved with controlling and eliminating static electricity in the printing and paper handling industry. $5. per copy. 17 pp.

Spense Engineering Co., Inc., Walden, N. Y. Bulletin No. 700, "Design Advantages of Spence Regulators." Features large cutaway illustration of typical Spence pilot-operated regulating valve with detailed explanations of five design features.

American Paper & Pulp Assn., 122 East 42nd St., New York 17, N. Y. Book, "The Statistics of Paper," third edition, 68 pp., $10. The revision of this valuable reference book includes three tables not previously shown: Average Value per Cord for Pulpwood in 1947; Number and Daily Capacity


CALENDER & EMBOSSING ROLLS
Built — Rebuilt — Reconditioned
Rebuilding and reconditioning calender rolls up to 240 inches is a Wheeler specialty, backed by 20 years experience. Wheeler products—supercalenders, embossing calenders, rolls, decorating equipment.
EASTERN REPR.—P. E. DUTCHER, 73 RANDOLPH ST., SPRINGFIELD 8, MASS.
THE WHEELER ROLL CO.
1910 LANE BLVD.
KALAMAZOO, MICH.

Because we fit the tubing to the job,



NATIONAL SEAMLESS is paying rich dividends in paper mill service

● Here at Tubing Headquarters, we have helped many paper mill engineers get longer, more effective service out of tubing. We've been able to do this because our engineers have a wide knowledge of tubing analyses—and what they will do—that is probably unsurpassed anywhere.

In some cases we have been able to double or even triple the life of tubing service simply by recommending a grade of steel more suitable to the job.

As the world's largest manufacturer of tubular products, we have amassed a file of case histories that covers just about every paper mill tubing problem—whether the tubing is used for product transfer, evaporators, condensers or heat exchangers. By long association with the pulp and paper industry we've learned which of the various steel analyses assures the best buy, the best cost-service ratio when exposed to the corrosive action of pulps, paper mill stocks, white waters, caustic liquors, and cleaning solutions.

Paper mill engineers who have used our free consultation service in the past are reaping rich dividends today. As the demand for paper goes up, and the wear and tear on equipment increases, NATIONAL Seamless Tubing that was properly applied in the past is now holding down tubing replacement costs to an almost irreducible minimum.

When you plan for future construction, remember that NATIONAL Seamless Tubing is manufactured in a complete range of sizes; and in all analyses, whether low carbon, medium alloy or stainless.

NATIONAL TUBE DIVISION, UNITED STATES STEEL COMPANY
PITTSBURGH, PA.

COLUMBIA-GENEVA STEEL DIVISION, SAN FRANCISCO, PACIFIC COAST DISTRIBUTORS
UNITED STATES STEEL EXPORT COMPANY, NEW YORK

All National Seamless Tubing is pierced from a solid billet of high quality steel. This method of manufacture results in absolutely uniform wall strength, since there are no longitudinal welds to weaken the tube.

U·S·S NATIONAL *Seamless* PIPE AND TUBES USS

UNITED STATES STEEL

of Paper Machines, 1899 through 1947; Value of Pulp, Paper and Board Shipments by States for 1947.

CHAS. T. MAIN, INC.
CONSULTING ENGINEERS
Process Studies, Design, Specifications and Engineering Supervision
PULP AND PAPER MILLS
Steam, Hydraulic and Electrical Engineering Reports, Consultation and Valuations
80 Federal Street Boston 10, Mass.

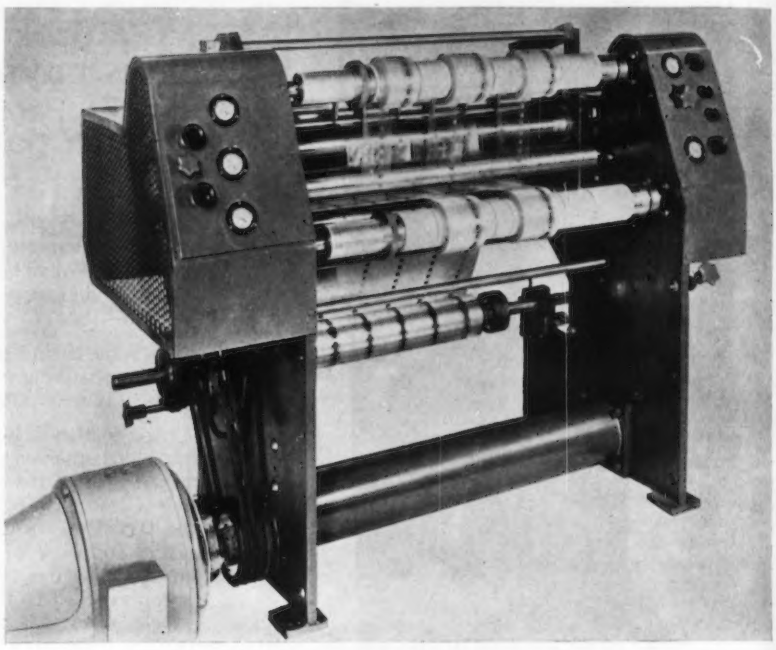
RODERICK O'DONOGHUE
CONSULTING ENGINEER
PULP MILLS — PAPER MILLS
IMPROVED PROCESSES—DESIGNS—REPORTS
420 Lexington Avenue
New York City 17

THE RUST ENGINEERING COMPANY
Engineers and Constructors
Pittsburgh, Pennsylvania
Complete Service for
PULP AND PAPER MILLS—PLANTS AND FACILITIES
DESIGN, CONSTRUCTION, MODERNIZATION

APPLETON Felts
FINISH & DESIGN
APPLETON WOOLEN MILLS
APPLETON WISCONSIN

THE CARTHAGE MACHINE COMPANY
CARTHAGE, NEW YORK
Manufacturer of
Machinery and equipment for Mechanical and Chemical Pulp Mills and Special Machinery

New Equipment
Supplies and Materials



Film, Foil, Tape Slitter

A new design of slitter for plastic film, foil and pressure sensitive tape is being marketed by John Dusenbery Co., Inc., 271 Grove ave., Verona, N.J.

Designed primarily for use on large scale production slitting, it is suited for engineering development purposes for slitting new products and obtaining quantitative data on products in production. Main tension controlling devices on the payoff and rewind are air-operated to enable operators to determine the optimum running conditions for a given material, and to duplicate previous performance. The main pull rolls and grooved cutting roll are driven by adjustable slip clutches, and may be idled or overdriven to control stretch between these rolls.

Adapted for both stationary razor blade and rotary burst type cutting, the machine (Model 585) construction boasts heavy-welded steel sideframes connected by welded torque tubes, sealed ball bearings, a drive to slip clutches through roller chain, precision gears which drive slitting rolls and pull rolls.

New Line of Metal-Clad Switchgear

A new standard line of metal-clad switchgear, ranging in ratings from 2400 to 13,800 volts, 150 to 500 mva, has been announced by the General Electric Co., Schenectady 5, N. Y.

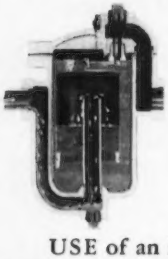
Named as one of the most important aspects of the new equipment is that it embodies design improvements but retains all industry standards. Notable among the new features is the magne-blast circuit breaker in which a maximum number of parts are interchangeable among breakers of different ratings. For example, solenoid mechanisms and many contact and arc extinguisher parts are identical in all ratings.

Another feature is an electro-mechanical control device built integral with the breaker mechanism. New and improved insulating material having flame-retardant, dielectric and anti-

G-E 13.8 KV indoor metal-clad switch-gear with the removable magne-blast air circuit breaker withdrawn for inspection.

ARMSTRONG PRODUCTS FOR BETTER PAPER MILL PERFORMANCE

SPECIAL TRAPS FOR DRYER DRAINAGE



Better Performance,

Low First Cost,

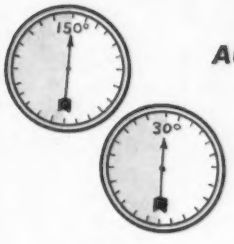
Low Maintenance.

USE of an individual Armstrong trap on each paper machine dryer insures quick removal of condensate, air and incondensible gases at any pressure, provides higher operating temperatures. The cost is far less than for more elaborate systems and the special new Armstrong paper machine trap gives you long life with low maintenance. Quality is guaranteed.

BULLETIN NO. 205 ➧

. . . explains why you can depend on Armstrong paper machine trap performance. Send for a copy.

INDIVIDUAL DRYER TEMPERATURE CONTROL FOR PAPER MACHINES



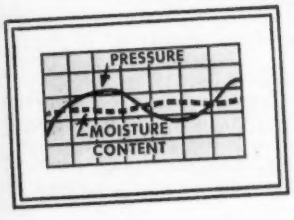
Automatically maintains dryer temperature at any point from 100°F to 250°F

THIS control mixes air with steam to maintain relatively cool wet end dryers. This prevents the sheet from sticking to the dryer surface and avoids curl or cockle due to overdrying on one side. The rest of the machine operates at maximum temperature.

BULLETIN NO. 187 ➧

. . . explains the Control and its advantages. Write for a free copy.

MOISTURE CONTROL SYSTEM FOR PAPER MACHINES



Automatically maintains very uniform sheet moisture content at any desired percent

THIS control maintains much more accurate sheet moisture content than is possible with hand control or constant steam pressure. It detects moisture content changes as the sheet passes over an "indicating dryer" and then varies steam pressure on the entire machine to compensate for the moisture variation.

BULLETIN NO. 196 ➧

. . . tells how the Moisture Control works, explains the specially designed components, lists the advantages. Send for your copy.

STEAM HUMIDIFIERS FOR PAPER STORAGE

Automatically adds moisture to maintain any desired relative humidity

ARMSTRONG Steam Humidifiers prevent the headaches caused by moisture loss from paper in storage; eliminate printing and converting problems. They connect into existing steam systems in much the same way as unit heaters, are economical, accurate, quiet, dripless. A size and type for every requirement.

BULLETIN NO. 1772 ➧

. . . discusses relative humidity, gives data and prices on Armstrong Humidifiers, explains hookups, selection, etc. Send for your copy.

ARMSTRONG MACHINE WORKS

818 Hoffman Street • Three Rivers, Michigan

The Controlled Flow

VICTORY BEATER

is manufactured by

THE NOBLE & WOOD MACHINE CO.

Paper Mill Machinery

Hoosick Falls • New York • U. S. A.

ASTEN

dryer felts

ECONOMY
in the long run

ASTEN-HILL MFG. CO., Philadelphia, Pa.
ASTEN-HILL LTD., Valleyfield, Quebec

FIBER RESEARCH AND SERVICE

Semi-Chem. and Chemical Pulp Processes

Pilot Plant Facilities

THE KINSLEY CHEMICAL COMPANY
Cleveland 11, Ohio

MISCO
STAINLESS STEEL CASTINGS

FOR ALL EQUIPMENT EXPOSED TO CORROSION BY SULPHITE ACIDS OR OTHER CORROSIVE AGENTS

MICHIGAN STEEL CASTING CO.
DETROIT 7, MICHIGAN

hygroscopic properties is used throughout the breaker. Still another improvement simplifies the breaker elevating mechanism which has a new positive-acting mechanical interlock designed to provide faster raising and lowering of the breaker.

Of welded construction, the equipment line has recessed screened vertical openings to provide top ventilation and prevent entry of falling dirt and casual drip.

Non-Alkaline Steam-Cleaning Compound

Known as Magnus 72, a new type of steam-cleaning compound is recommended by the manufacturer, Magnus Chemical Co., Garwood, N. J. for use wherever steam or vapor cleaning equipment is in service.

Unique because it contains no alkaline salts, it removes a serious hazard of conductivity of alkaline solutions and their residues. Described as an exceptionally fast and thorough cleaner, Magnus 72 is a liquid concentrate, said to be neutral in reaction; does not streak or dull good paint; is non-corrosive; safe for operators; has no objectionable fumes and can be used indoors. Without any change in set-up, the producer believes the compound will prove ideal for cleaning paper mill equipment, and wherever dirt is oily or greasy.

High Temperature Solid Lubricant

A solid, high-temperature lubricant known as Molkolube has been marketed by Westinghouse Electric Corp., 306 Fourth Ave., Pittsburgh 30, Pa.

A superior lubricant for moving parts that operate too hot for ordinary oils and greases, molybdenum disulfide has been available only in the form of a powder, in a water suspension, or as an additive to greases. Using a slight amount of phenolic binder, it is molded into desired solid form by heat and pressure. Sticks or brushes of molded Molkolube can be held by spring pressure against the rotating member so that some of it is wiped onto the hot surface to be lubricated. It can be used readily at temperatures to 700° F. and in some case up to 2100° F. for short periods and in inert atmospheres, it is stated.

Quick-Setting Cement

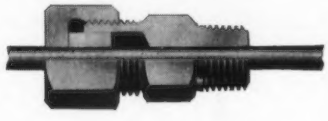
Por-Rok Cement is a newly-developed compound of interest to those concerned with setting machinery in concrete by means of anchor bolts, or in patching concrete floors. A product of Hallemite Mfg. Co., 2446 West 25th St., Cleveland 13, Ohio (Dept. PJ), the pourable cement is a replacement for critical lead and sulfur for most bolt-setting operations.

Self-bonding, self-leveling, oil-resistant, the cement is applied cold with no heating hazard, the manufacturer states. Compression strength of 4500 lbs. psi. has been verified by an independent testing laboratory, it is claimed. Descriptive literature available.

Stainless Steel Packing Glands

A new series of stainless steel packing glands designed for general use and ease of installation in process control, pilot plant or laboratory installations are known as Conax Packing Glands, a product of Conax Corp., 4515 Main St., Buffalo 21, N. Y.

Type PG-2 and PG-4 Packing Glands are furnished with asbestos-graphite packing and may be used as small stuffing boxes or to seal static lines, thermocouple wells, dial-type thermometer stems, or any other round tubes or rods. Type PG-3 employs powdered



Talc as a sealant and is therefore chemically inert and may be used at temperatures exceeding 1400°F. Type PG-3 Packing Glands cannot be used as stuffing boxes for moving parts, but provide excellent pressure or vacuum seals for stationary tubes. They are available to accommodate tubes from 1/8" to 13/32" (1/8" I.P.S.) outside diameter at the present, and the company expects to increase the maximum size to 3/4" diameter in the near future.

The inside diameter of all Conax Packing Glands are bored to customers' specifications. Any plastic or other satisfactory packing material may be used in place of the material furnished with the glands with excellent results. All units are made of type 303 stainless steel throughout.

ASSOCIATIONS

Syracuse Alumni to Hold 18th Annual Luncheon

The 18th annual luncheon of the State University of New York, College of Forestry, Pulp and Paper Alumni, will be held as usual during Paper Week on February 20, 1952. The luncheon will start promptly in the Henrik Hudson Room of Hotel Roosevelt at 12:30 p.m. with a preliminary get-together in the lounge beginning at 12:00 noon.

The class of '27 will be honored this year on its 25th anniversary. Bob Huntley will act as the representative of this class.

Continuing a custom begun last year, the association will provide a suite at the Hotel Commodore to serve as a

meeting place for staff and students of the college, alumni and friends.

Henry Mohrer of Federal Paperboard will have charge of the get-together suite.

Empire State TAPPI Meet

Plans for the joint 1952 meeting of Empire State Section of TAPPI and the Niagara Branch of the Technical Section of C.P.P.A. have proceeded very smoothly. It will be held June 19th-21st, 1952 in Niagara Falls, Ontario. The facilities of the General Brock Hotel have been engaged and all business and program meetings will take place there.

The following officers and committee chairmen have been appointed for the joint meeting:

Chairman—J. S. Reichert; Co-Chairmen—S. G. Stapley, and I. V. Earle; Secretary — W. A. Logan; Co-Secretary—F. P. Heil; Treasurer—G. K. Storin; Co-Treasurer—P. F. J. Dolan; Technical Program Committee Chairman—R. C. Shearer; Co-Chairman—W. H. Monsson; Hotel Arrangements Committee Chairman—A. B. Gorham; Publicity Committee Chairman — J. J. Forsythe; Co-Chairman—W. E. Dyke; Mill Visit Committee Chairman—H. E. Karberg; Co-Chairman—J. W. Youngchild; Exhibits Committee Chairman—B. B. Gralow; Entertainment Committee Chairman—D. Hart; Prizes Committee Chairman—B. J. Staneslow.

Special emphasis has been laid on the program for the joint meeting and four excellent panel discussions have been planned. Thursday morning, June 19th, the first panel, "Waste Paper—Its Growing Importance to the Paper Industry," will be presented. Thursday afternoon, the second panel, "Mechanical Pulp—Its Expanding Applications in Paper Manufacture," will be offered. On Friday morning, June 20th, the third panel "Recent Trends in Pulp Bleaching Processes" will be given. The fourth panel discussion. "Quality Requirements by Paper Consumers," will take place on Saturday morning, June 21st. Complete details as to the panel moderators will be announced in the near future.

Mich. Supts. Plan Double Feature for Feb. 21 Meet

One feature will deal with mill illumination; the other, with modern color schemes for plant maintenance.

A representative of the General Electric Co. or of one of its subsidiaries is to make the presentation on plant lighting; L. S. Oyster, Maintenance Sales Supervisor, E. I. du Pont de Nemours & Co., Finishes Division, the presentation on modern color schemes. Mr. Oyster will supplement his remarks by showing a 16mm. sound movie in color entitled "A Case for Color."

The meeting is to be held at Hotel Harris, Kalamazoo, Mich., at 6:30 P.M.

Maine Alumni Luncheon

ORONO, Me.—The University of Maine Pulp and Paper Foundation will present its second annual Honor Award when the University of Maine Pulp and Paper Alumni Luncheon is held in New York on February 19 in the Bowman Room of the Biltmore Hotel at 12:30 p.m. Robert Ramsdell, Holyoke, Mass., will be the chairman.

All University of Maine alumni connected with the pulp and paper and allied industries and members of the University of Maine Pulp and Paper Foundation are invited to the affair which is held annually in conjunction with Paper Week activities in New York.

The winner of this year's Honor Award will not be announced until the time of the luncheon. Winner of the award last year was Dr. Ralph H. McKee "in recognition of his initiating and establishing the first college course of pulp and paper technology in the country at the University of Maine in 1913."

M.I.T. Luncheon

The annual M.I.T. Alumni luncheon for Paper Makers will be held on Wednesday, February 20, at the Engineers Club, 32 W. 40th St., New York. J. J. Healy, Jr., is the chairman; D. F. Lowry, Penick & Ford, 420 Lexington Ave., New York City, is in charge of reservations.

FREELY SEPARABLE

End your Roll S-E-P-A-R-A-T-I-O-N problems!

Put an end to hammering and prying in your finishing room . . . eliminate roll damage and unproductive labor. The new Johnstone F-S (Freely Separable) Slitters and Roll Winders are setting a standard of performance never before possible. Applicable to any kind of dry, uncoated paper . . . rewound rolls of any width.

Write today for descriptive bulletin No. 9511.

JOHNSTONE
Engineering & Machine Co.
PARKESBURG, PENNA.

The Heavy-duty FOURTEEN F-S has 6¼" diam. winding drums. Standard sizes handle rolls 42", 52", 62", 72" & 82" wide; rewound diameters up to 36". The TWELVE F-S has 4" winding drums, and standard sizes take rolls 32", 42", & 52" wide; rewound diameters to 24".

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Non-Returnable, Durable standard mill core.

GARTEX

Returnable and Non-Returnable extra strong mill core for regular and special needs.

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PAPER TUBE, INC.
655 WEST INGHAM AVE.
TRENTON, NEW JERSEY
NEW YORK OFFICE—500 5th AVE.

EUROPEAN SPOTLIGHT

The month of October did not bring many changes in the general situation on the European paper market. Prices seemed a little more stabilized, with only a few countries reporting minor price increases. Generally, demand exceeds output of the mills by some hundreds percent, though in some countries the high prices did cause a small fallback of demand.

Topic of the month was again newsprint. In the Netherlands, the price of newsprint will be increased on January 1 from 63 cents to 84 cents a kg. In 1937 the price was 7 cents a kg! The same tendency can be seen throughout Europe.

The problem of newsprint is a serious one, not likely to be solved in a near future by increased production, but only by changing distributing methods. Again and again, European publishers repeat, it would be good if American and Canadian publishers would diminish a little of their consumption of newsprint. Up till now, international organizations have spoken about this problem with much understanding, and with little success.

Articles and speeches of American and Canadian mill owners, depicting the distress of the European newspaper publishers show little knowledge of the causes of newsprint scarcity in Europe.

The figures listed below show the quantities of paper exported in the first half year of 1951 and 1950 respectively, in metric tons:

	6 Months	
	1951	1950
Newsprint	102,269	102,218
Kraft paper	127,873	123,322
Sulphite wrapping paper	37,724	37,057
Other papers	83,663	76,079
Boards	24,836	25,928
	376,365	364,604

Correspondents tell about a new mill for making fine papers in Northern Sweden, which was put into operation recently. It is owned by the Mo and Domsjö group and has an annual capacity of 10,000 tons. The Swedish-built paper machine with 28 drying cylinders runs at 200 meters of fine-grade paper per minute.

Western Germany. In Bavaria a new paper mill was inaugurated August 3. The plant was installed in an old factory building, which was enlarged and modernized, in Kaufbeuren. The paper is used in the paper converting factory of the owners, Messrs. Hans Kolb in Memmingen.

The steady growth of paper production in Western Germany is illustrated by the following interesting figures:

GERMANY—WESTERN ZONES—PRODUCTION IN METRIC TONS

	Chemical Wood Pulp	Mechanical Wood Pulp	Paper & Board	Newsprint *
Monthly average 1948	20,384	18,352	62,244	7,388
Monthly average 1949	31,700	24,070	105,430	10,585
Monthly average 1950	41,472	29,558	130,420	14,139
Monthly average six months 1951	45,151	34,072	145,158	13,303
1951 April	47,927	37,352	153,066	13,460
1951 May	47,057	33,130	140,249	12,461
1951 June	49,134	36,282	158,880	13,595
1951 July	50,743	35,238	155,604	14,039
1951 August	50,701	35,054	159,631	13,994

* Included in the former column.

Ireland. The Irish paper mills want to expand their production in the near future from 25,000 tons to 36,000 tons a year. There is at present no production of woodpulp in Ireland, but one plant has announced plans to produce about 3,000 tons annually of semi-chemical woodpulp by the soda process system at an experimental plant.

Sweden. An official Swedish report states that the insufficient supplies of sulphur will cause a diminishment in the production of sulphite pulp of 150,000 tons a year. In 1950, production of sulphite pulp was about 1.4 million tons. Sweden receives allocations for 11,600 tons of sulphur in 3 months, whereas it needs 60–65,000 tons yearly.

A further difficulty in the Swedish paper industry is lack of coal. Considerable quantities of wood are used now for heating purposes which may have bad effects on the pulpwood situation.

Netherlands. Dutch paper production increased 17 percent during the first nine months of 1951, reaching 276,415 metric tons against 235,961 tons in the first nine months of 1950. Though there are some difficulties on the home market, caused by a general lull in various industries, such as textiles, leather, housing, etc., combined with converters and merchants preferring to use their stocks and to wait with new purchases, most paper mills are able to increase their exports and are working at top capacity.

The figures below show production of various kinds of paper during the first nine months of 1950 and 1951, in metric tons:

	9 Months 1950	9 Months 1951
Newsprint	58,206	67,338
Mechanical writing and printing	13,428	16,070
Woodfree writing and printing	46,763	54,311
Wrappings	98,438	118,799
Other papers	19,125	19,896
	235,961	276,415

Italy. The Italian paper industry had hoped for better conditions on the home market during the Fall, but up till now production exceeds demand, which caused a further fall in prices. Reduced prices are offered especially for fine papers, whereas coarse wrapping papers are rather steady in price with better sales conditions.

Price of newsprint remains firm though conditions are not very favorable, most Italian newspapers working with great losses. Production of newsprint increased considerably, being about 24 percent more in the first five months of 1951, compared with the first five months of 1950.

Prices of woodpulp did not change. Imports in the first eight months of 1951 were 113,125 tons; for the same period of eight months in 1950 imports of woodpulp were 144,115 tons. Also, the imports of paper declined: 18,987 tons in 1951 (8 months) and 23,461 tons in 1950 (8 months). Exports, however, grew considerably: 27,626 tons in eight months of 1951, and 8,130 tons in the same period in 1950.

Switzerland. During some years, Switzerland restricted the imports of papermaking materials. This year, however, import of woodpulp increased again as is shown by the figures below:

9 Months	Metric Tons	Millions Franc
1948	38,494	31.23
1949	9,547	6.68
1950	14,736	6.58
1951	26,319	35.07

Swiss production of paper rapidly increases. The highest prewar figure is for 1937 with 120,000 metric tons. Since 1940 there has been a constant increase in output and in 1948 the record came to 178,000 tons. Paper production this year is estimated at 200,000 tons. Reports say that demand continues far in excess of deliveries.

Spain. The Spanish paper industry also has made a "come-back." In 1950, production of paper and board was 166,432 metric tons, against 140,207 tons in 1949. Most important item in Spanish paper production are esparto writings and printings (83,514 tons), boards (17,328 tons), and newsprint (16,946 tons).

Poland. In Kostrzyn, where the rivers Warta and Oder unite, Poland's biggest paper and pulp mill is being built. When the mill is ready, it will produce more pulp than all the mills together in Poland could turn out before the war.

Irish Imports

In October, 1951, the Republic of Ireland imported paper and cardboard, etc., to a total value of £1,070,188 as against £503,485 in October, 1950. These imports brought the total value to £6,794,815 for the first ten months of 1951, as against £3,955,008, in the corresponding period of 1950.

Alberta Construction Near

OTTAWA — Just as soon as timber leases covering approximately 2,000 square miles of forest limits within about 100 miles of Red Deer in Alberta area are approved, it is understood work will commence on a project to erect a $20 million plant for the Alberta Pulp mills at Red Deer.

The plans for this huge project are said to be completed and are now ready for a "go ahead" signal to erect a pulp mill with a daily capacity of 200 tons of sulphate pulp as well as a housing scheme for the workers to be employed there.

Union Bag Buys Acreage

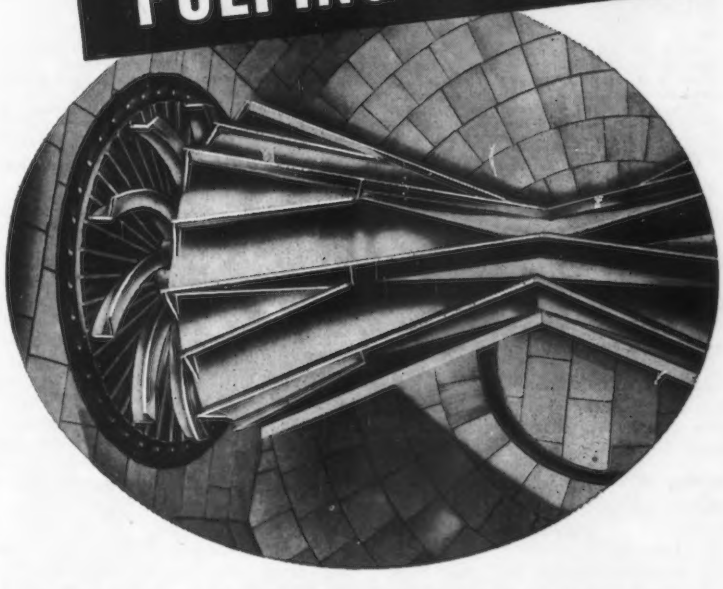
The biggest real estate transaction in Glynn county, Ga. history, dollarwise, was completed yesterday with sale of the county holdings of the former Brunswick Pensinsula Corp. to the Union Bag and Paper Corp. for $2,690,000.

A total of 26,003 acres of forests were involved, making the price about $100 an acre the highest ever paid in this vicinity for so large a tract. The land is considered top-quality pulp wood acreage.

E.D. Jones

Rotor of No. 4 size Jones Pulp-Master, shown in tile tank installation in a leading midwestern mill. Capacity 4000 lbs. 6½% stock.

PULPING POWER



The rugged, one-piece fabricated rotor of the PULP-MASTER, placed well above the bottom of the tank, gives stock vigorous, continuous circulation — yet allows junk metal to drop to the tank bottom.

Its vanes force the stock outward, where the impellers rub and refine it against the fixed refining discs. Baled pulp, waste paper, machine broke — even glassine and wet strength — is completely disintegrated in 10 to 40 minutes.

Over 140 sold to date. Ask your Jones representative for details — or write for Bulletin 1019-B.

E.D. Jones **PULP-MASTER**

E. D. Jones and Sons Company, Pittsfield, Mass.

BUILDERS OF QUALITY STOCK PREPARATION MACHINERY

AMERICAN PAPER AND PULP ASSOCIATION'S PAPER PRODUCTION RATIO REPORT

(Production as per cent of normal capacity)

COMPARATIVE WEEKLY SUMMARIES

	Dec. 1	Dec. 8	Dec. 15	Dec. 22	Dec. 29
1951	99.9	98.8	97.0	97.4r	60.4
	Dec. 2	Dec. 9	Dec. 16	Dec. 23	Dec. 30
1950	97.1	100.1	100.1	95.2	69.2

COMPARATIVE MONTHLY SUMMARIES

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Year Avg.
1950	92.6	95.6	96.7	95.4	96.4	97.7	85.3	99.6	96.1	101.0	99.6	91.2	95.8
1951	99.3	101.3	101.9	102.8	102.2	100.1	88.6	97.7	94.3	100.8‡	98.4‡		

‡ Preliminary.
r Revised.

COMPARATIVE YEARLY SUMMARIES

	1944	1945	1946	1947	1948	1949	1950	1951
Year to Date	88.1	89.7	101.4	104.9	96.7	88.6	96.2	99.2
Year Average	88.1	89.4	101.1	104.3	96.2	88.6	95.8	

PAPERBOARD OPERATING RATIOS†

	Dec. 1	Dec. 8	Dec. 15	Dec. 22	Dec. 29
1951	80	86	86	86	n.a.
	Dec. 2	Dec. 9	Dec. 16	Dec. 23	Dec. 29
1950	101	106	105	105	63

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Year Ave.
1950	88	92	91	92	91	94	82	100	96	102	101	95	94
1951	102	105	104	105	104	103	84	94	86	87	82		

All of the above data is based on tonnage reported to American Paper and Pulp Association. Does not include mills reporting to National Paperboard Association, except in isolated cases where both paper and paperboard are produced and separate tonnage figures are not readily available. Does not include mills producing newsprint exclusively.

Note: The black line on the chart shows the ratio through December 1950 on the basis of 6-day capacity. Beginning with January 1950 the ratio is shown on the new basis of normal 6 and 7-day capacities by the colored line. Paperboard operating ratios continue on the basis of a 6-day week.

† Per cent of operation based on "inch-hours" reported to the National Paperboard Association.

OBITUARIES

Benjamin D. Rogers, retired personnel manager and director of Bird & Sons, died December 27.

Creighton Hill, personnel manager and director of Bird & Sons, and successor of B. D. Rogers, died on December 30.

Arthur W. Pohlman, 69, founder and president of the A. W. Pohlman Paper Co., died at his home in Maplewood, N. J., January 1.

He was active in National Paper Trade Assn., and organizer and first president of Paper Club of New York.

Joseph B. Kindleberger, 45, vice-president in charge of consumer and market research of the Kalamazoo Vegetable Parchment Co., and a director of KVP and of the KVP Co., Ltd., died suddenly in Kalamazoo, Mich. on January 3. He was the son and only child of the late Jacob Kindleberger, founder of KVP. He is survived by his mother, Mrs. Jacob Kindleberger; by his widow, Helen Price Kindleberger; and by daughters Ruth, Martha Jo, Lucy, and a grandson.

Frank L. Aikens, 59, a sales representative for Harris-Seybold Co.'s Central District, died December 3 at his home in Cleveland.

Maurice E. Cody, Hamilton, Ohio, a director of the American Box Board Co., died December 20 following a heart attack in his home.

W. Chester Johnston, 66, salesman for the National Paper Co. since 1945, died December 20 at his home in Rochester, N. Y. His wife survives.

Clifford W. Gaylord, president, Gaylord Container Corp., died January 7 at Barnes Hospital, St. Louis, after a long illness.

His death followed by one day the death of his uncle, Robert Gaylord, founder of the paper box company from which developed the Gaylord Container Corp.

Sir Walter Grasbeck, 59, managing director of the Finnish Cellulose Assn., died last week.

Sir Walter was known to a host of friends in the United States and, in fact, all over the world. He possessed that warm, friendly personality, irresistible because it was true and deep-felt. He was proud of his creation, the Finnish Cellulose Assn., which he built up during a period of 33 years. He was proud of the constructive work that he had been able to perform as managing director of his association and grateful for the support and confidence which he and his association received throughout the world.

Sir Walter was probably the most decorated civilian in the world. The latest decoration bestowed upon him was Commander of the French Legion of Honor, but, under all these decorations, he remained always the same old friend — understanding, and ready to help. He enjoyed life thoroughly and he cherished friendship. He found time, far outside of his own crowded business activities, to help Finland, his native country, as an ambassador of good will on many occasions to the United States, Great Britain, and many other countries.

Additional University of Maine Subscribers

ORONO, Me.—John B. Calkin, secretary of the University of Maine Pulp and Paper Foundation, has announced the names of several concerns which have recently become company members or special subscribers to the Foundation. Company members include the following:

Downingtown Manufacturing Co.; Robert Gair Co., Inc.; P. H. Glatfelter Co.; John A. Manning Paper Co., Inc.; Mohawk Paper Mills, Inc.; J. O. Ross Engineering Corp.; The Rust Engineering Co. and Fitchburg Paper Co.

The new list of special subscribers includes Bird Machine Co.; Cheney Bigelow Wire Works; Parkman A. Collins Co.; Improved Paper Machinery Corp.; Chas. T. Main, Inc.; Norton Co.; Papermakers Felt Assn.; Riegel Paper Corp.; Rogers Fibre Co., Inc.; Peter J. Schweitzer, Inc. and Sacony-Vacuum Oil Co.

Eastern Thomas Destroyed

A six alarm fire burned to the ground the Eastern Thomas Paper Stock Co. office and warehouse on Friday, January 4. The 5-story building, a block long, was the scene of one of the largest fires in the city for sometime.

It was reported to have been caused by an over-heated stoved.

The Task Confronting Us

"What does our program for defense mobilization lack?

"I think its most serious lack is a full appreciation on the part of Americans of the world crisis that confronts us.

"We need a new climate of understanding — and with it a determination to meet all the requirements of this crisis, *even if it hurts* — as it will.

"None of us is going to be hurt compared with the men we have sent out to Korea to suffer, to bleed and to die.

"Let us think of these heroes when we are prone to grumble about the relatively small demands defense mobilization is making upon us here at home . . .

"I am an optimist in our long-range ability to do the job; but I am not complacent about the immediate tasks at hand.

"Never before, not even in the days of World War II, have I felt as compelled as I do now to urge that we Americans bend every effort to achieve a National purpose to become strong.

"Let us never forget that this program has arisen from the horrible fact that the free, liberty-loving nations are being challenged by an enemy whose ideology, philosophy and practice are 180 degrees opposite to our own.

"The task confronting us . . . is to build our might to such a point that we shall be in no danger of losing our own sacred freedom and liberty."

—CHARLES E. WILSON, *Director of Defense Mobilization.* Before The National Press Club, Washington, D. C., December 13, 1951.

A Thought for The New Year

A First Marine Division chaplain, just returned from Korea, reported on television that the most unpopular person in Korea today was the "American Civilian," who collectively has little interest in Korea, the sacrifices of our men there, and appears to be concerned only with his collective comfort and well being.

What are your willing sacrifices going to be this year?

You can start by donating Blood and joining Civil Defense, minor contributions on your part but a start to be sure.

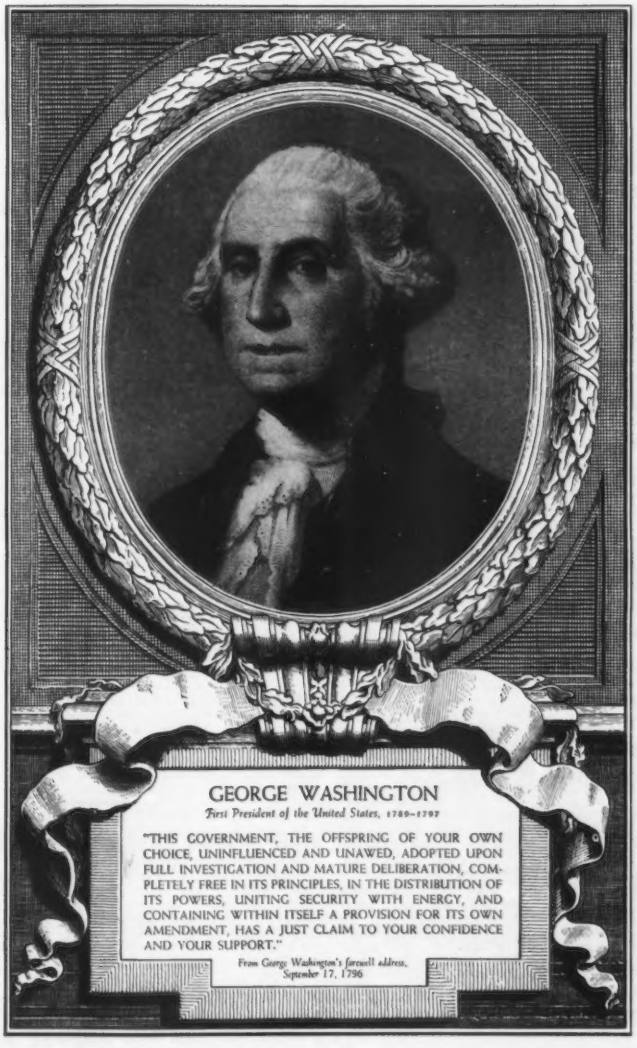
Henry J. Perry

Fighting Paper Wanted

Invitation to bid has been issued by the New York Quartermaster Procurement Agency, 111 East 16th Street, New York 3, N. Y., on QM-30-280-52-875, covering Paper, tracing, 100 percent rag, white, width 36", 10 yds. per roll, 960 rolls. Bids will be opened January 29, 1952, at 11:00 a.m. (EST) at the New York office. This procurement is for the U. S. Navy.

QM-30-280-52-844, covering Paper, dextrine, gummed, English finish, 620 reams. Bids will be opened January 21, 1952, at 2:00 p.m. (EST) at the New York office. This procurement is for the U. S. Navy.

QM-30-280-52-869, covering Cup, paper, hot drinks, round, flat bottom, 2 piece, 3,371,000 each. Bids will be opened January 29, 1952, at 1:00 p.m. (EST) at the New York office. This procurement is for the U. S. Army.


GEORGE WASHINGTON
First President of the United States, 1789–1797
"THIS GOVERNMENT, THE OFFSPRING OF YOUR OWN CHOICE, UNINFLUENCED AND UNAWED, ADOPTED UPON FULL INVESTIGATION AND MATURE DELIBERATION, COMPLETELY FREE IN ITS PRINCIPLES, IN THE DISTRIBUTION OF ITS POWERS, UNITING SECURITY WITH ENERGY, AND CONTAINING WITHIN ITSELF A PROVISION FOR ITS OWN AMENDMENT, HAS A JUST CLAIM TO YOUR CONFIDENCE AND YOUR SUPPORT."
From George Washington's farewell address, September 17, 1796

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Canton, Massachusetts
WOOLEN MANUFACTURERS SINCE 1856

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CHIEF ENGINEER

Experienced Paper Mill Engineer to develop the Engineering Department and new products of a rapidly growing machinery company. This is an excellent opportunity for a top man and the pay scale warrants a top man. Applicant must be a graduate engineer with a minimum of ten years experience in the industry. Kraft experience preferred but not essential. Please reply to Box number 52-4, care Paper Trade Journal. J-11

WANTED
PAPER MILL ENGINEER

Engineer-constructor firm has opening for Pulp and Paper Mill project engineer at Pittsburgh Headquarters. Must have 4 or more years experience in engineering department of a paper mill, or experience in pulp and paper mill design. In first letter submit complete resume of personal background, education, age, and experience. Write O. M. Rutledge, The Rust Engrg. Co., 575 Sixth Ave., Pittsburgh, Pa. J-11

WANTED—Master Mechanic or Assistant for modern 3-Machine Tissue Mill. Progressive management; expansion program now under way. Fine opportunity for young/middle aged man to advance. Substantial paper mill mechanical experience with electrical background desirable. Give complete resume of experience in letter to Box 51-442 care Paper Trade Journal. Replies held strictly confidential. TF

SALARIED POSITIONS $3,500 to $35,000. We offer the original personal employment service (established 42 years). Procedure of highest ethical standards is individualized to your personal requirements. Identity covered; present position protected. Ask for particulars. R. W. BIXBY, INC. —117 Dun Bldg., Buffalo, 2, N. Y. TF

WANTED—One Tour Foreman for sulphite pulp mill located in Western Massachusetts. Salary according to ability. Address Box 51-633 care Paper Trade Journal. J-18

SALESMAN—Experienced. Wanted by direct selling Mill to call on Lithographers, Printers and Converters in New England and Middle Atlantic States area. Excellent opportunity. Address Box 52-9 care Paper Trade Journal. J-18

WORKING SUPERINTENDENT for small fast growing Eastern mill making lightweight specialties. Cylinder machine experience essential. State qualifications and salary expected. Address Box 51-596 care Paper Trade Journal. TF

WANTED — Machine Tenders and Back Tenders for corrugating medium and liner mill, Fourdrinier and cylinder machines. Located in Western Pennsylvania; good working conditions; pleasant surroundings and very good labor relations. Call collect—Tarentum 1470. TARENTUM PRODUCTS CORPORATION, Tarentum, Pa. TF

HELP WANTED

MEN WANTED—POSITIONS OPEN

We can place—working superintendent lightweight papers; chemists and laboratory men; sulphite foreman rotating shift; master mechanics; plant, mechanical and designing engineers; machine tenders and back tenders; graduate mechanical engineer for steam power supervisor in northern mill; chief power engineer.

LIST YOUR CONFIDENTIAL APPLICATION WITH US
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CHARLES P. RAYMOND SERVICE, Inc.
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SPECIALISTS IN PLACING AND IN SUPPLYING PULP AND PAPER MILL EXECUTIVES J-11

Personnel Service Associates

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Personnel Consultants

Confidential placement services for employers and employes in the pulp and paper industries and allied trades. Attractive positions and competent men always listed. (Administrative-technical-sales-general personnel) J-11

Opportunity for paper mill engineer with both fourdrinier and cylinder machine experience with paper mill machinery manufacturer located in eastern U. S. Must have a good record, willingness to work, and ability to assume responsibility. In reply give resume of experience, educational background, age, and salary requirements. Address Box 52-12 care Paper Trade Journal. J-25

POWER PLANT ENGINEER WANTED to take complete charge of power department. Address Box 51-635 care Paper Trade Journal. J-25

PLANT ENGINEER—Opportunity for qualified graduate Engineer with extensive experience in general plant engineering and operations in the Pulp and Paper Industry and particularly the kraft process. Address Box 52-2 care Paper Trade Journal. TF

SITUATIONS WANTED

SUPERINTENDENT desires change. Thoroughly experienced in finishing and converting—highly successful in production—good labor relations. A-1 references. Address Box 51-636 care Paper Trade Journal. J-11

TOP FLIGHT BUSINESS with technical background, languages, many years in Europe, South America, specialized in selling machinery and accessories for Pulp & Paper industries, organizing foreign trade, free to assume responsible position. Address Box 52-11 care Paper Trade Journal. J-11

CHEMICAL ENGINEER—40. With a background in pulp and paper in research, control and production, desires a job in an established Research & Development Group not necessarily in pulp and paper, but where that knowledge would be of value. Address Box 52-7 care Paper Trade Journal. J-18

ADDITIONAL LINES desired by Sales Engineer covering midwest paper mills. Would prefer lines starting with chipper or grinder up to and including first press section. Address Box 52-8 care Paper Trade Journal. J-18

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READY DRESSED
MILL COGS
LABOR SAVING TIME SAVING

The most economical filling that can be put in a mortise wheel

QUICK SERVICE
ON ALL SIZES

Write for Instruction Sheet "G" which is free

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SOUTH BEND, IND.

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Two machine Cylinder Tissue mill suitable for Twisting, Waxing or Wrapping grades. New York State location. Address Box 51-640, care Paper Trade Journal. J-18

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CHICAGO OFFICE
DONCO PAPER SUPPLY CO. 919 N. MICHIGAN
SU. 7-7849 J-11

FOR SALE—1—L-5 Nash Vacuum Pump; 1—15 hp. G.E. Motor; 2—Sheaves. Address Box 52-13 care Paper Trade Journal. J-11

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We are always in the market to purchase your surplus or idle machinery. What have you to offer? Wanted Cylinder and Fourdrinier Machines (complete mills).

FOR SALE

BEARINGS
72—Top and bottom Dryer Bearings 7" diameter x 12" long.

BEATERS
1—Dilts Iron Tub Laboratory Beater. Beater roll 14" diameter x 10½" face.

CALENDER STACKS
1—9 roll 68" Calender Stack.
1—72" 4 roll calender stack. (Extra heavy duty).
1—54" Smoothing Calender Stack, 2 Iron Rolls, 2 Cotton Rolls.
1—60" 3 roll friction calender stack. All iron rolls.

CHEST
1—Cast Iron Stock Chest, 25' long x 6' high. (With agitator).

CHIPPER
1—96" Murray 4 knife Chipper—anti-friction bearings.

CLASSIFINER
1—Dilts Classifiner, practically new, with motor.

CRUSHER & HAMMERMILL
1—Murray Chip Crusher.
4—Jeffrey Hammermill.

CYLINDER MOLDS
2—30" diameter x 72" face.
1—36" diameter x 79" face.
5—36" diameter x 54" face.
1—36" diameter x 96" face.
1—48" diameter x 72" face.
1—30" diameter x 92" face.
1—36" diameter x 72" face.
1—42" diameter x 120" face.
5—42" diameter x 130" face.
1—48" diameter x 117" face.

DRIVES
1—Jones Reducer 75 h.p.—30.8 to 1.
1—#6½ Reeves Drive.
1—#4 Reeves Drive
1—Reliance Electric Drive, complete with 5 gear head motors.
1—#5 Reeves Drive (totally enclosed).

DRYERS
1—Complete unit, consisting of 6 dryers, 36" diameter x 38" face, including frames, gears, anti-friction bearings.
7—24" diameter x 48" face.
1—36" diameter x 143" face.
1—48" diameter x 70" face.
2—Dryers 48" diameter x 134" face.
1—24" diameter x 92½" face.
2—28" diameter x 48" face.
8—24" diameter x 60" face. frames.
1—20" diameter x 61" face, complete with
1—36" diameter x 67" face.
1—60" diameter x 68" face.
1—84" diameter x 48" face.

FLAT SCREENS
1—6 plate Shartle Flat Screen.
2—Packer, 12 plate, roller shoe type.
1—6 plate Sandy Hill (Packer).

FOURDRINIER PARTS FOR 134" MACHINE
6—Suction Boxes, 34 table rolls, Brass Slide Rails.

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1—60" Cutter.

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1—Horne Jordan.
4—Noble & Wood Mammoth.

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2—IMPCO Lime Sludge Filters, vacuum type, 5' diameter x 4' face.

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Write us regarding your requirements.

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3—Sets Primary Presses, complete, 145" face. Anti-friction bearings. Also all types of rolls for 145" wet end.

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Various cone and assorted pulleys.

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1—Noble & Wood Pulper—Iron Tub.
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PUMPS
Various sizes of Centrifugal and Plunger Pumps. Write us regarding your particular requirements.
4—Shartle Brothers circulating pumps, each 4,000 g.p.m.

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1—123"—3 bowl Revolving Reel.
1—72" Dowingtown Reel, 2 bowl.

REFINERS
2—#1 Claflin Refiners.

ROLLS
Felt, Table, Press, Breast, Couch, etc. Various sizes and types. (Bronze, Rubber, Iron, etc.)

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1—#2 Bird Rotary Screen.

SAVEALLS
1—#5 Bird Saveall.
2—Savealls, 36" diameter x 136" face cylinder molds, iron end vats.

SHEETER
1—65" Clark Sheeter, 8 roll backstand.

SHREDDERS
2—Daniels Rag Cutters.

SLITTERS & WINDERS
1—115" 2 drum Waldron
2—112" Cameron—Type 18.
1—104" Beloit two drum winder.
1—92" Moore & White 4 drum winder.
1—82" Cameron—Type 10-10.
1—62" Cameron—Type 26-3A.
1—62" Cameron—Type 8-10.
1—60" Langston (Shear cut).
1—52" Cameron—Type 8-5.
1—42" Cameron Constant Tension with pneumatic control.
1—62" Cameron—Type 10.
1—72" Cameron—Type 8-10.
1—72" Cameron—Type 10.
2—42" Cameron Type 40-1-AF

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1—10 x 20 Shartle Duplex.
1—7 x 16 Shartle Duplex.
2—10 x 10 Beloit Duplex, low type, with motors.
Advise as to your requirements.

SUCTION COUCH ROLL
1—Sandusky Couch Roll 126" drilled face x 22" diameter

SUCTION BOXES
5—136" face Suction Boxes.
6—140" face.

TABLE ROLLS
34—5" diameter x 138" face.

THICKENERS
1—Pulp Thickener, cylinder mold 48" x 117" with spare cylinder molds.

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2—72" Hudson-Sharp (Surface type winder).

VACUUM PUMPS
1—L-4 Nash Vacuum Pump.
1—N-82 Nash, for Fulton-Midwest System.

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1—72".

YANKEE DRYERS
1—48" Face x 84" Diameter, Frames & Bearings.
1—68" face x 60" diameter including frames and anti-friction bearings.

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SCRAP ALUMINUM FOILS

Mounted Laminated and Clean

Any Quantities

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J-18

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1—E. D. Jones 1800# Iron Tub Beater.
1—E. D. Jones 1200# Iron Tub Beater.
3—E. D. Jones 2000# Washer Beaters.
1—Dilts Bandless 62" x 50" Beater Roll.

Calender Rolls & Stack

1—7 Roll 64" face with frames.
4—11½" x 134" face, rolls only.
1—22" x 96" face, roll only.
1—22" x 92" face, roll only.
Many rolls miscellaneous dia. and widths.

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1—48" x 167", hollow shaft.
1—48" x 138", solid shaft.
1—42" x 86", solid shaft.

Drives

6—Moore & White Angle Drives.
3—Beloit Enclosed Spiral Gear Drives, 40 H.P.
3—Downingtown Enclosed Spiral Gear Drives, 23 H.P.
1—No. 4 Reeves Drive, anti-friction bearings.
1—O-2 Lewellyn Drive.

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60—48" dia., 46" face Chromium Plated.
8—42" dia., 130" face with rope drives.
1—60" dia., 90" face Creping Dryer.
17—36" dia., 72" face, with frames & gears.

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10—12 Plate Sandy Hill type.
8—12 Plate Harmon Improved type.
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2—6 Plate, Sandy Hill type.

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1—54" Smith & Winchester, with motor.

Jordans

1—No. 2 Dillon.
1—Noble & Wood Monarch.
1—Noble & Wood Pony.

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1—8" x 16" Black & Clawson Triplex.
1—10" x 16" Black & Clawson Triplex.
1—7" x 9" Moore & White Triplex.

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1—90", two-spool upright.
1—74", two-spool upright.

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10—No. 2 Bird Screens.
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1—15" x 74" Müllspaugh, complete with drive.

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1—48" Cameron Rewinder.
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J-11

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WANTED—For Chemical Plant—Evaporators, Pressure Vessels, Rotary Dryers, Kilns, Generators, Boilers, Filters. Send full details and will arrange for prompt inspection. Address Box 51-637 care Paper Trade Journal. TF

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J-11

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LAMINATOR GL-2
LAMINATES PAPERS, FOILS, CELLOPHANES, TO PAPERS, BOARDS WITH PASTES • GLUES • ASPHALTS
Better bonding...Greater productivity
MULTI-PURPOSE
LAMINATOR
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THE all-purpose GL-2 Laminator uses materials direct from parent rolls and rewinds, after laminating with either hot or cold glues and pastes. The machine is so designed that each operating assembly can be readily changed to handle the ever-growing list of new laminants and materials. Completely flexible, it can be rearranged for longer sheet leads . . . new assemblies added . . . or old ones subtracted. Standard 60-inch unit has one hot or cold dryer and is equipped with paste or glue applicator. An asphalt applicator may also be added. Provisions are made for by-passing the sheet so that either of the two applicators can be used with equal facility. Additional drying units can be added to speed production by faster sheet curing if desired. Similar laminators are made for use with wax, crystalines and hot melts. Rewinders and backstands of various types can be furnished. Write for complete details and specifications.

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That's all it takes to measure paper up to 0.25" thick with the motorized Gurley Stiffness Tester. It easily handles tissue, newsprint, book, bonds, ledgers, industrial papers, cardboard and carton stocks, and permits a wide range of readings from 1 to 3,358,720.

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Farrel-Birmingham Co.
Hamblett Machine Co.
Lobdell United Co.
Magnus Metal Corp.
Michigan Steel Casting Co.
The Noble & Wood Machine Co.
Rice Barton Corporation
The Sandy Hill Iron & Brass Works
Shartle Brothers Machine Co.
Smith & Winchester Mfg. Co.
Valley Iron Works Co.
Walworth Company

CENTRIFUGAL MACHINERY
Bird Machine Co.
Nichols Engrg. & Research Corp.
Ross, J. O., Engrg. Co.
Shartle Brothers Machine Co.

CHAINS
Jeffrey Mfg. Co.

CHEMICAL COTTON PULP
Hercules Powder Co.

CHEMICALS
American Cyanamid Co., Industrial Chem. Div.
Bunge Pulp & Paper Co.
Calco Chemical Co.
Calgon, Inc.
Diamond Alkali Co.
Dow Chemical Company
E. I. du Pont de Nemours & Co., Inc.
General Dyestuffs Corp.
Geigy Co., Inc.
B. F. Goodrich Chemical Co.
Gottesman & Co.
Hercules Powder Co.
Heyden Chemical Corp.
Hooker Electrochemical Co.
The Kinsley Chemical Company
Monsanto Chemical Company
National Aluminate Corp.
Naugatuck Chemical Division of U. S. Rubber Co.
Niagara Alkali Company
Nopco Chemical Co.
Pittsburgh Plate Glass Co., Columbia Chemical Division
Reichhold Chemicals, Inc.
Rohm & Haas Co.
Virginia Smelting Co.
Wyandotte Chemicals Corp., Michigan Alkali Div.

CHESTS
The Bagley & Sewall Company
E. D. Jones & Sons Co.
Kalamazoo Tank & Silo Co.
The Noble & Wood Machine Co.
Shartle Bros. Mch. Co.

CHIP PACKERS
Fibre Making Processes, Inc.

CLEANING MATERIALS
American Cyanamid Company Industrial Chemicals Division
Diamond Alkali Co.
The Dow Chemical Company
E. I. du Pont de Nemours & Co., Inc.
General Dyestuff Corp.
Monsanto Chemical Company
Nopco Chemical Co.
Pittsburgh Plate Glass Co.
Wyandotte Chemicals Corp., J. B. Ford Division

CLUTCHES
Appleton Machine Co.
The Bagley & Sewall Company
Black Clawson Company
Farrel-Birmingham Co.
Hudson-Sharp Mch. Co.
Moore & White Co.
D. J. Murray Mfg. Co.
Rice Barton Corporation
The Sandy Hill Iron & Brass Works
Shartle Bros. Mch. Co.
Stephens-Adamson Mfg. Co.

COATING MACHINERY
Dilts Machine Works
Frank W. Egan & Co.
Gibbs-Brower Company, Inc.
The Mayer Machine Co., Inc.
Moore & White Co.
Potdevin Machine Co.
Rice Barton Corporation
The Sandy Hill Iron & Brass Works
Shartle Brothers Machine Co.
Waldron Corporation, John
Weber, Herman G., & Co., Inc.

COATING MATERIALS
American Cyanamid Company Industrial Chemicals Division
The Dow Chemical Co.
E. I. du Pont de Nemours & Co., Inc.
B. F. Goodrich Chemical Co.
The Goodyear Tire & Rubber Company
Hercules Powder Co.
J. M. Huber Corp.
Monsanto Chemical Company
Naugatuck Chemical Division of U. S. Rubber Co.
Nopco Chemical Co.
Plaskon Division, Libbey-Owens-Ford Glass Co.
Reichhold Chemicals, Inc.
Wyandotte Chemicals Corp., Michigan Alkali Div.

COMPLETE FOURDRINIER ROLL GRINDING
Manchester Machine Co.

COMPRESSORS
Allis-Chalmers Mfg. Co.
Nash Engineering Co.
Roots-Connersville Blower Corp.

CONDENSATE FILTERS
Hungerford & Terry Inc.
The Permutit Company

CONDENSERS
Fibre Making Processes, Inc.

CONSISTENCY REGULATORS
Askania Regulator Co.
Bird Machine Company
DeZurik Shower Company
Paper & Industrial Appliances

CONSULTING ENGINEERS
Black Clawson Company
Dilts Machine Works
Ebasco Services
Frank W. Egan & Co.
Alvin H. Johnson & Co., Inc.
Main, Inc., Chas. T.
The Rust Engrg. Co.
Shartle Bros. Mch. Co.
J. E. Sirrine & Co.
Frank C. Vaughan
John Waldron Corp.

CONTINUOUS DIGESTER
Paper & Industrial Appliances

CONTROLLERS
Black Clawson Company
The Brown Instrument Co.

CONTROLS
The Brown Instrument Co.
Johnson Corp.
Poirier Control Co.
Shartle Bros. Mch. Co.
Stickle Steam Specialties Co.

CONVERTING MACHINERY
The Bagley & Sewall Company
Egan, Frank W., & Co.
John Waldron Corp.
Dilts Machine Works

CONVEYORS
Black Clawson Company
Jeffrey Mfg. Co.
Murray, D. J., Mfg. Co.
Ross Engineering Corp., J. O.
Shartle Brothers Mch. Co.

CORES
Elixman Paper Co.
Smith & Winchester Mfg. Co.
Sonoco Products Co.

CORROSION RESISTANT
Amercoat Corporation

COTTON LINTER
Alpha Cellulose Corp.
Hercules Powder Co., Inc.
Railway Supply & Mfg. Co.

COTTON PULP
Alpha Cellulose Corp.

COUCH ROLLS
Beloit Iron Works
Improved Paper Machinery Corp.

COUPLINGS
The Bagley & Sewall Company
Black Clawson Company
Farrel-Birmingham Co., Inc.
E. D. Jones & Sons Co.
Lovejoy Flexible Coupling Co.
Moore & White Co.
The Noble & Wood Machine Co.
Rice Barton Corporation
The Sandy Hill Iron & Brass Works
Shartle Brothers Machine Co.
Valley Iron Works
Waldron Corp., John

CRANES
Whiting Corp.

CURL TESTER
Thwing-Albert Instrument Co.

CUTTERS
The Bagley & Sewall Company
Beloit Iron Works
Black Clawson Company
Dilts Machine Works
Gibbs-Brower Company, Inc.
Graphic Arts International Corp.
Thomas W. Hall Co.
Jagenberg-Werke Akt. Ges.
Moore & White Co.
Perkins & Son, Inc., B. F.
Rice Barton Corporation
The Sandy Hill Iron & Brass Works
The Smith & Winchester Mfg. Co.
Taylor, Stiles & Co.

CYLINDER MOULDS
Black-Clawson Co.
Improved Paper Machinery Corp.
Manchester Machine Co.
Rice Barton Corporation

CYLINDERS
M. W. Jenkins Sons, Inc.

DAMPENERS
Perkins & Son, Inc., B. F.
Valley Iron Works Co.

DECKLE WEBBING
Williams-Gray Co.

DEFIBRATORS
American Defibrator Co.

DE-INKING
Dilts Machine Works
General Dyestuff Corp.
Kinsley Chemical Co.
The Sandy Hill Iron & Brass Works
Shartle Brothers Machine Co.

DEINKING CHEMICALS
E. I. du Pont de Nemours & Co., Inc.
General Dyestuff Corp.
Kinsley Chemical Co.
Nopco Chemical Co.

DE-MINERALIZING EQUIPMENT
Hungerford & Terry, Inc.
The Permutit Company

DEMULSIFIERS
Wyandotte Chemicals Corp., Michigan Alkali Div.

DENSOMETERS
Bunge Pulp & Paper Co.
W. & L. E. Gurley

DESIGN CONSTRUCTION
Ebasco Services

DETERGENTS
American Cyanamid Company Industrial Chemicals Division
Calgon, Inc.
Diamond Alkali Co.
General Dyestuff Corp.
Monsanto Chemical Company
Nopco Chemical Co.
Rohm & Haas Co.
Wyandotte Chemicals Corp., Michigan Alkali Div.

DEWAXING CHEMICALS
American Cyanamid Company Industrial Chemicals Division
General Dyestuff Corp.
Nopco Chemical Co.

DIFFERENTIAL SCALES
Thwing-Albert Instrument Co.

DIGESTERS CIRCULATING SYSTEMS
Fibre Making Processes, Inc.

DIGESTERS
Babcock & Wilcox Co.
Blaw Knox Company
Chicago Bridge & Iron Co.
Combustion Engineering-Superheater, Inc.
Lukenweld
Paper & Industrial Appliances
Pusey & Jones Corp.

DISPERSING AGENTS
Calgon, Inc
Diamond Alkali Co.
General Dyestuff Corp.
Monsanto Chemical Company
National Aluminate Corp.
Nopco Chemical Co.
Rohm & Haas Co.
Wyandotte Chemicals Corp., Michigan Alkali Div.

DOCTORS
The Bagley & Sewall Company
Bird Machine Company
Black Clawson Company
Downingtown Mfg. Co.
Lobdell United Co.
Lodding Engineering Corp.
The Moore & White Co.
Rice Barton Corporation
The Sandy Hill Iron & Brass Works
Shartle Brothers Machine Co.

DOCTOR BLADES
The Bagley & Sewall Company
Bird Machine Company
Lodding Engrg. Corp.
The Moore & White Co.
Rice Barton Corporation
The Sandy Hill Iron & Brass Works
Shartle Brothers Machine Co.
Simonds Saw & Steel Co.

DRIERS
The Bagley & Sewall Company
Black Clawson Company
Downingtown Mfg. Co.
Gibbs-Brower Company, Inc.
Lukenweld
The Moore & White Co.
Murray Mfg. Co., D. J.
J. J. Ross Company
Red-Ray Mfg. Co., Inc.
Rice Barton Corporation
Ross Paper Machy. Co.
The Sandy Hill Iron & Brass Works
Shartle Brothers Machine Co.
Valley Iron Works Co.

DRIERS—LABORATORY
The Noble & Wood Machine Co.

DRILLED SUCTION COUCH ROLLS
Manchester Machine Co.

DRILLED SUCTION DRUM ROLLS
Manchester Machine Co.

DRIVES
Allis-Chalmers Mfg. Co
Appleton Machine Co.
The Bagley & Sewall Company
Beloit Iron Works
Bird Machine Co.
Black Clawson Company
Downingtown Mfg. Co.
Fairbanks, Morse & Co.
Farrel-Birmingham Co.
Jeffrey Mfg. Co.
General Electric Company
Gibbs-Brower Company, Inc.
Moore & White Co.
Murray, D. J., Mfg. Co.
Pusey & Jones Corp.
Rice Barton Corporation
J. J. Ross Company
Ross Paper Machy. Corp.
The Sandy Hill Iron & Brass Works
Shartle Bros. Mch. Co.
Valley Iron Works Co.

DRUM WINDERS
Manchester Machine Co.
Rice Barton Corporation

DRYER DRAINAGE
Stickle Steam Specialties Co.

DRYER ROLL PYROMETER
Thwing-Albert Instrument Co.

DUSTERS
Appleton Machine Co.
Downingtown Mfg. Co.
Frank W. Egan & Co.
M. W. Jenkins Sons, Inc.
E. D. Jones & Son Co.
Moore & White Co.
D. J. Murray Mfg. Co.
John Waldron Corp.

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John Waldron Corp.

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Gibbs-Brower Company, Inc.
Holyoke Machine Co.
Northern Engraving & Mch. Co.
B. F. Perkins & Son, Inc.
John Waldron Corp.
Wheeler Roll Co.

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Raymond, Chas. P., Service, Inc.

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Nopco Chemical Co.
Rohm & Haas Co.
Wyandotte Chemicals Corp.

ENZYMES
Rohm & Haas Co.
Vanderbilt Co., R. T.

EVAPORATORS
Goslin-Birmingham Mfg. Co., Inc.
Murray, D. J., Mfg. Co.
Swenson Evaporator Co., Div. of Whiting Corp.

EXPANDERS
Mount Hope Machinery Co.

FANS
General Electric Co.
B. F. Perkins & Son, Inc.
Ross Engineering Co., J. O.

FEEDERS
Jeffrey Mfg. Co.
Merrick Scale Mfg. Co.
The Permutit Company
Stephens-Adamson Mfg. Co.

FELTS
Appleton Woolen Mills
Asten-Hill Mfg. Co.
Draper Bros. Corp.
Huyck & Son, F. C.
Lockport Felt Co.
Morey Paper Mill Supply Co.
Shuler & Benninghofen
Waterbury Felt Co.
Waterbury, H., & Sons Co.
Williams-Gray Co.

FELT CLEANERS
Calgon, Inc.
General Dyestuff Corp.
Nopco Chemical Co.

FELT CONDITIONERS
Bird Machine Co.
The Noble & Wood Machine Co.
Rice Barton Corporation
The Sandy Hill Iron & Brass Works

FELT GUIDES
Black Clawson Company
Frank W. Egan & Co.
Gilbert & Nash Co.
Moore & White Co.
The Noble & Wood Machine Co.
Rice Barton Corporation
The Sandy Hill Iron & Brass Works
Shartle Brothers Machine Co.
Waldron Corp., John

FIBRE BOARD MACHINES
The Noble & Wood Machine Co.

FILLERS
American Cyanamid Company, Industrial Chemicals Division
J. M. Huber Corp.
A. M. Meincke & Son, Inc.
Vanderbilt Co., R. T.
Wyandotte Chemicals Corp., Michigan Alkali Div.

FILTERS
Bird Machine Company
Holyoke Machine Co.
Hungerford & Terry, Inc.
Improved Paper Machinery Corp.
Johnson Corp.
Moore & White Co.
J. O. Ross Engrg. Corp.
The Sandy Hill Iron & Brass Works
Walworth Company

FITTINGS
The Bagley & Sewall Company
Crane Company
Shartle Bros. Mch. Co.
Walworth Company

FLEXIBLE COUPLINGS
Egan, Frank W., & Co.
Jeffrey Mfg. Co.
Lovejoy Flexible Coupling Co.
John Waldron Corp.

FLOORING, GRATING AND TREADS
The Goodyear Tire & Rubber Company
Norton Co.

FLOW BOXES, STAINLESS-CLAD
Lukens Steel Co.
Rice Barton Corporation
The Sandy Hill Iron & Brass Works

FORK LIFT TRUCKS
Elwell Parker Elec. Co.
Towmotor Corp.

FORMATION TESTERS
Thwing-Albert Instrument Co.
Williams Apparatus Co., Inc.

FOURDRINIERS
Beloit Iron Works
Black Clawson Company
Downingtown Mfg. Co.
The Moore & White Co.
Noble & Wood Machine Co.
The Sandy Hill Iron & Brass Works
Shartle Brothers Machine Co.

FREENESS TESTERS
Testing Machines, Inc.
Williams Apparatus Co.

GASKETS
The Goodyear Tire & Rubber Company

GEARS
The Bagley & Sewall Company
Black Clawson Company
De Laval Steam Turbine Co.
Downingtown Mfg. Co.
Frank W. Egan & Co.
Farrel-Birmingham Co.
E. D. Jones & Sons Co.
Moore & White Co.
D. J. Murray Mfg. Co.
Rice Barton Corporation
The Sandy Hill Iron & Brass Works
Shartle Brothers Machine Co.
Smith & Winchester Mfg. Co.
Stroh Process Steel Co.
Valley Iron Works Co.
Westinghouse Electric Corp.
Western Gear Works

GRAPPLES
Blaw-Knox Company

GRAVITY FILTERS
Holyoke Machine Co.

GRINDERS
Carthage Machine Co.
Farrel-Birmingham Co.
Gibbs-Brower Company, Inc.
Lobdell United Co.
Norton Company
Samuel C. Rogers and Company
The Sandy Hill Iron & Brass Works

GRINDING WHEELS
Norton Company
Simonds Abrasive Co.

GUIDES
The Bagley & Sewall Company
Black-Clawson Co.
Egan, Frank W., & Co.
Gilbert & Nash Co.
The Moore & White Co.
Mount Hope Machinery Co.
Rice Barton Corporation
John Waldron Corp.

GUMMING MACHINES
Dilts Machine Works
Egan, Frank W., & Co.
The Sandy Hill Iron & Brass Works
Waldron, John, Corp.

GUMS
Hercules Powder Co., Inc.
National Starch Products, Inc.
Stein-Hall Co., Inc.

HEAT EXCHANGERS AND RECOVERY SYSTEMS
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Ross Engineering Corp., J. O.
Valley Iron Works Co.
Ross, J. O., Engrg. Corp.

HOSE (Air, Water, Suction, etc.)
The Goodyear Tire & Rubber Company

HUMECTANTS
Aktivin Division, Heyden Chemical Corp.
Nopco Chemical Co.
Wyandotte Chemicals Corp., Michigan Alkali Div.

IMPREGNANTS
American Cyanamid Company, Industrial Chemicals Division
B. F. Geodrich Chemical Co.

INDENTING MACHINES
Dilts Machine Works

INDUSTRIAL TRACTORS
Towmotor Corp.

INKOMETER
Thwing-Albert Instrument Co.

INSTRUMENTS, TESTING AND MEASURING
Black-Clawson Co.
Brown Instrument Co.
Bunge Pulp & Paper Co.
Cambridge Instrument Co.
General Electric Company
W. & L. E. Gurley
B. F. Perkins & Son
Taylor Instrument Cos.
Testing Machines, Inc.
Thwing-Albert Instrument Co.
Williams Apparatus Co.

JOINTS
The Bagley & Sewall Company
Beloit Iron Works
Johnson Corp.
Lovejoy Flexible Coupling Co.
Rice Barton Corporation
Shartle Bros. Mch. Co.

JORDAN FILLINGS
Appleton Machine Co.
Bahr Brothers Mfg. Co.
E. D. Jones & Sons Co.
The Noble & Wood Machine Co.
Shartle Bros. Mch. Co.
Smith & Winchester Mfg. Co.
Valley Iron Works Co.

KNIVES
Black Clawson Company
Dilts Machine Works, Inc.
Hamblet Machine Co.
E. D. Jones & Sons Co.
The Moore & White Co.
The Noble & Wood Machine Co.
Simonds Saw & Steel Co.
Taylor Stiles & Co.
Valley Iron Works Co.

KNOTTERS
Black-Clawson Co.
Fibre Making Processes, Inc.
Improved Paper Machinery Corp.

LABORATORY CORRUGATOR
The Noble & Wood Machine Co.
Thwing-Albert Instrument Co.

LABORATORY EQUIPMENT
Appleton Machine Co.
Bauer Brothers Co.
Bird Machine Company
Dilts Machine Works
W. & L. E. Gurley
Egan, Frank W., & Co.
E. D. Jones & Sons Co.
Taylor Instrument Companies
Testing Machines, Inc.
Valley Iron Works Co.
John Waldron Corp.
Williams Apparatus Co., Inc.

LAMINATING MACHINES
The Bagley & Sewall Company
Dilts Machine Works
Egan, Frank W., & Co.
Rice Barton Corporation
John Waldron Corp.

LAY BOYS
Dilts Machine Works
Gibbs-Brower Company, Inc.
Hamblet Machine Co.
Moore & White Co.

LINTER COTTON
Alpha Cellulose Corp.
Hercules Powder Co., Inc.
Railway Supply & Mfg. Co.

LINTER PULP
Alpha Cellulose Corp.
Hercules Powder Co., Inc.

LUBRICANTS
Sinclair Refining Co.
Socony-Vacuum Oil Co.
Sun Oil Company
The Texas Company
Tide Water Associated Oil Co.

MAGAZINE REELS
Dilts Machine Works (Kohler Systems)

MATERIALS HANDLING
Dilts Machine Works
Jeffrey Mfg. Co.
Shartle Bros. Mch. Co.
The Wellman Engrg. Co.

METAL TIRES
Stroh Process Steel Co.

MICROMETERS & CALIPERS
Farrel-Birmingham Co.
Lobdell Co.
Stephens-Adamson Mfg. Co.
Testing Machines, Inc.

MICRO-CRYSTALLINE WAXES
Bareco Oil Co.
Bunge Pulp & Paper Co.
Sun Oil Company

MOISTURE CONTENT CONTROL
Cambridge Instrument Co.
Williams Apparatus Co., Inc.

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Fairbanks, Morse & Co.
General Electric Company
Reliance Electric & Engrg. Co.

NEWSPRINT
Bunge Pulp & Paper Co.

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The International Nickel Co.

NOZZLES
Spray Engrg. Co.

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The Bagley & Sewall Company
Black-Clawson Co.
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PAPER MACHINES
The Bagley & Sewall Company
Beloit Iron Works
Bagley & Sewall Co.
Black Clawson Company
Downingtown Mfg. Co.
Gibbs-Brower Company, Inc.
Thomas W. Hall Co.
Lukenweld
Moore & White Co.
Pusey & Jones Corp.
Rice Barton Corporation
J. J. Ross Company
Ross Paper Machy. Corp.
The Sandy Hill Iron & Brass Works
Shartle Brothers Machine Co.
Smith & Winchester Mfg. Co.

PAPER MACHINES—LABORATORY
The Noble & Wood Machine Co.

PAPER MACHINE SLICES
Black Clawson Company
E. D. Jones & Sons Co.
The Moore & White Co.
Rice Barton Corporation
The Sandy Hill Iron & Brass Works
Valley Iron Works Co.

PAPER TUBE MACHINERY
Dietz Machine Works
Gibbs-Brower Company, Inc.
Thomas W. Hall Co.
Hudson Sharp Machine Co.
Jagenberg-Werke Akt. Ges.
Langston Co., Samuel M.

PARAFFINE WAXES
Sun Oil Company

PARAFFIN WAX EMULSIONS
Hercules Powder Co., Inc.
Nopco Chemical Co.

PASTING MACHINES
Beloit Iron Works
Black Clawson Company
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Crane Company
Grinnell Company
Michigan Steel Casting Co.
National Tube Co.
Walworth Company

PIPE FITTINGS
Armco Drainage & Metal Products, Inc.
Crane Company
Grinnell Company
Michigan Steel Casting Co.
Walworth Co.

PITCH CONTROL
American Cyanamid Company, Industrial Chemicals Division
General Dyestuff Corp.
Monsanto Chemical Company
National Aluminate Corp.
Nopco Chemical Co.
Rohm & Haas Co.

PLASTICIZERS
American Cyanamid Company, Industrial Chemicals Division
Aktivin Division, Heyden Chemical Corp.
B. F. Goodrich Chemical Co.
Naugatuck Chemical Division of U. S. Rubber Co.
Nopco Chemical Co.

PLATERS
Gibbs-Brower Company, Inc.
Perkins & Son, Inc., B. F.

PLATES
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Babcock & Wilcox Co.
J. O. Ross Engrg. Corp. Lukenweld Division
Lukens Steel Company
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PLUGS
The Appleton Machine Co.
Black Clawson Company
E. D. Jones & Sons Co.
The Noble & Wood Machine Co.
Shartle Brothers Machine Co.

POPE TYPE REELS
Black-Clawson Co.
Egan, Frank W., & Co.
Manchester Machine Co.
Rice Barton Corporation

PRECISION SAMPLE CUTTER
Testing Machines, Inc.
Thwing-Albert Instrument Co.

PRESERVATIVES
E. I. du Pont de Nemours & Co.
General Dyestuff Corp.

PRESS ROLLS
Beloit Iron Works
Black-Clawson Co.
Rice Barton Corporation

PRESSURE FILTERS
Holyoke Machine Co.

PRESSURE VESSELS
Chicago Bridge & Iron Co.
Combustion Engineering-Superheater, Inc.

PRESSES
Black Clawson Company
Dietz Machine Works
Farrel-Birmingham Co.
Gibbs-Brower Company, Inc.
Thomas W. Hall Co.
Hudson-Sharp Mch. Co.
The Moore & White Co.
Potdevin Machine Co.
Rice Barton Corporation
The Sandy Hill Iron & Brass Works
Shartle Brothers Machine Co.
Valley Iron Works Co.
Waldron Corp., John
H. G. Weber & Co., Inc.
Williams Apparatus Co.

PULLEYS
Black-Clawson Co.
Lovejoy Flexible Coupling Co.
Rice Barton Corporation

PULP CLASSIFIER
The Bauer Bros. Co.
Thwing-Albert Instrument Co.

PULP CLEANERS
Nichols Engrg. & Research Corp.

PULP STOCK VALVES
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Record Fdy. & Mach. Co.
Shartle Brothers Machine Co.

PULPERS
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Bauer Brothers Co.
Dilts Machine Works
E. D. Jones & Sons Co.
Morden Machines Co.
The Noble & Wood Machine Co.
Shartle Brothers Machine Co.

PULPS
Alpha Cellulose Corp.
Brown Company
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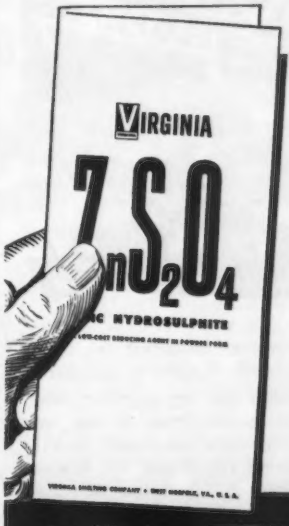

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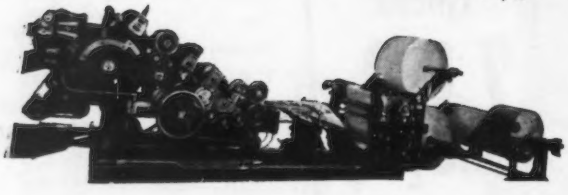

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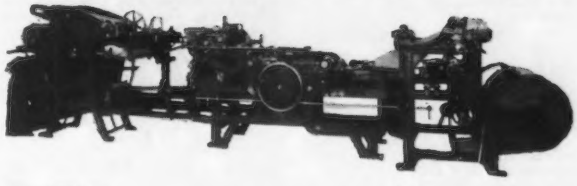

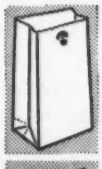

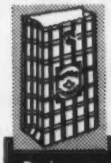

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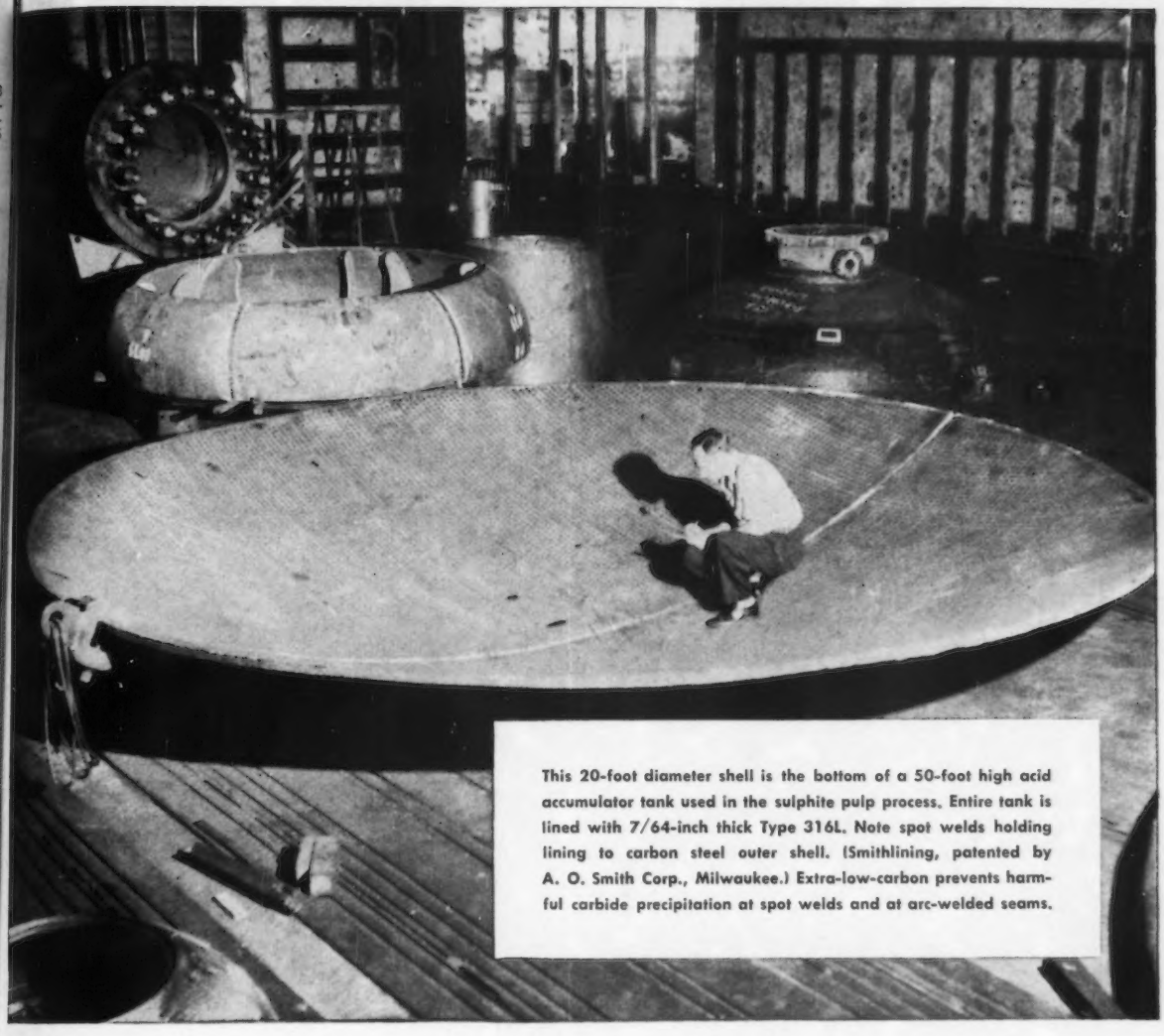

This 20-foot diameter shell is the bottom of a 50-foot high acid accumulator tank used in the sulphite pulp process. Entire tank is lined with 7/64-inch thick Type 316L. Note spot welds holding lining to carbon steel outer shell. (Smithlining, patented by A. O. Smith Corp., Milwaukee.) Extra-low-carbon prevents harmful carbide precipitation at spot welds and at arc-welded seams.

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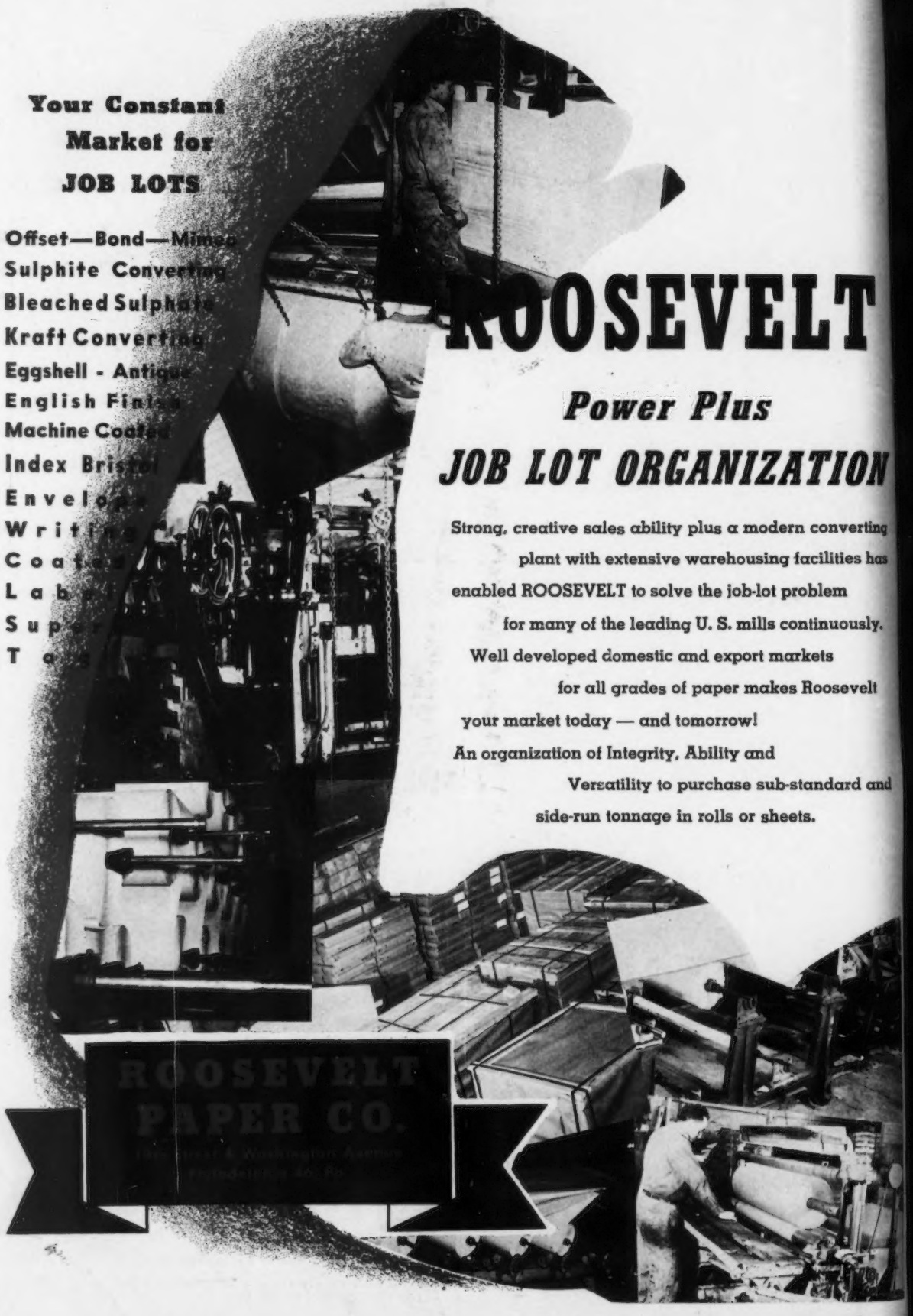
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